FLORA EDINENSIS:

OR

A DESCRIPTION OF PLANTS GROWING NEAR EDINBURGH,

ARRANGED ACCORDING TO THE LINNEAN SYSTEM.

WITH

A CONCISE INTRODUCTION TO THE NATURAL ORDERS

OF THE

CLASS CRYPTOGRAMIA,

AND ILLUSTRATIVE PLATES.

BY

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MDCCCXXIV.
Omnes species originem familie suae primam ab ipsissima Omnipotentis Creatoris manu numerant; creatis enim speciebus æternam legem generationis et multiplicationis intra speciem propriam imposuit Naturæ Auctor rebus.

LINN. Crit. Bot.
TO

ROBERT GRAHAM,

M. D. F. R. S. E. M. W. S.

PROFESSOR OF BOTANY IN THE UNIVERSITY OF EDINBURGH,

&c. &c. &c.

THIS FLORA OF THE ENVIRONS OF THE SCOTTISH

METROPOLIS

IS DEDICATED,

WITH EVERY FEELING OF ESTEEM AND REGARD,

BY HIS FRIEND

ROBERT KAYE GREVILLE.
PREFACE.

The utility of local Floras has been so universally acknowledged, that it must excite a considerable degree of surprise to find that no attempt prior to the present one has been made to describe, or even to enumerate the plants growing around the Metropolis of Scotland. This feeling cannot but increase, when we reflect that Edinburgh is the seat of a University far-famed for its Medical School, in which the study of Botany holds even a legal rank.

The nature of the adjacent country is besides admirably calculated to repay the labours of the botanist. Its great variety of scenery produces a corresponding variety of plants. There is sufficient elevation in the range of the Pentland Hills to yield a vegetation characteristic of the approach to an alpine region. The shores of the Frith of Forth, a large arm of the sea, which rolls its waters within two miles of the city, contribute a vegetation equally distinct; while the waves themselves nourish a host of interesting and beautiful Algæ or Sea-weeds. In this wide field, the active Student of the present age, from the general
advancement of Science, feels, with more energy, the
want of some direction to its treasures, and some descrip-
tion of them when acquired. This desideratum I have,
during the last three years, been endeavouring to sup-
ply, and the result is now submitted to the public.

In regard to the authenticity of the species and sta-
tions contained in the work, it is only necessary to state,
that those gentlemen to whom I owe communications,
invariably accompanied them with their names, which
will be found in their respective places. At the same
time, it may be observed, that I have, with very few ex-
ceptions, verified their discoveries. In this place, I trust,
it will be permitted me to state, that I commenced this
undertaking under peculiar disadvantages, as no one had
ever examined the surrounding country with a view to
ascertain the extent of its botanical riches, except Sir
Robert Sibbald, who published a catalogue of plants
growing in the King's Park, containing 381 species and
varieties, as early as 1684; and Mr Yalden, who com-
municated one to Lightfoot from the same district,
containing 313 species, excluding varieties. The stations
of most of the rarer Phanerogamous plants were indeed
known, chiefly through the zeal of George Don, Mr
Patrick Neill, and Mr R. Maughan; but I had
to make as full a catalogue as possible. Few Crypto-
gamic vegetables had been detected, or even sought for;
and among the Hypoxyla, Fungi, Gastromyci, Bys-
soideae, and Epiphyteae, scarcely half a dozen species
were on record. In order, therefore, to produce a re-
spectable Flora Edinensis, I was obliged to be con-
stantly in the fields, or on the sea-shore. Many plants
nevertheless remain, without doubt, to be added in a
subsequent edition. In collecting materials for the Mosses and the fresh-water Algae, I was fortunately joined by Mr Walker Arnott, and to his active researches I am indebted for several rare species. Captain Wauch of Foxhall has an equal claim upon me for his liberal mycological contributions, and Dr Richardson for some excellent marine Algae. To other individuals who have kindly favoured me with communications I present my grateful acknowledgments.

As it was necessary to confine my researches within a certain extent of the surrounding country, I have deemed it, upon the whole, desirable to limit that extent to the distance of ten miles. This rule has, with very few exceptions, been adhered to; so that almost every plant introduced is attainable by the student in a morning’s walk.

With a view to render the work as useful as possible, I have added a brief Introduction to the Class Cryptogamia, and illustrated it by original figures.

The characters of the genera are arranged synoptically at the commencement of the work; and a reference will be found at the end of each character, to the page where the species are described in the body of the work.

R. K. G.

Edinburgh, January 7, 1824.
INTRODUCTION
TO THE
CLASS CRYPTOGAMIA.

In the following Introduction, we can do nothing more than give a general view of the subjects it embraces,—sufficient, nevertheless, it is hoped, to enable the Student to prosecute his researches with comparative facility and much additional pleasure. A more intimate knowledge, especially of the physiology of Cryptogamic Vegetation, must be sought in those works which treat the subject in detail.

Linnaeus divided the Vegetable Kingdom into the following twenty-four Classes.

I. Monandria, the flowers of which contain a single stamen.
II. Diandria, 2 stamens.
III. Triandria, 3 stamens.
IV. Tetrandria, 4 stamens, (all of equal length).
V. Pentandria, 5 stamens, (the anthers not united).
VI. Hexandria, 6 stamens, (all of equal length).
VII. Heptandria, 7 stamens.
VIII. Octandria, 8 stamens.
IX. Enneandria, 9 stamens.
X. Decandria, 10 stamens, (filaments not united).
XI. Dodecandria, 12 or more stamens arising from the receptacle.
XII. Icosandria, about 20 stamens arising from the calyx or corolla.
XIII. Polyandra, many stamens arising from the receptacle.
XIV. Didynamia, 4 stamens, 2 being longer than the rest. (Never more than 1 pistil.)
XV. Tetrodynamia, 6 stamens, 4 being longer than the rest. (Cruciflorous flowers with 1 pistil.)
XVI. Monadelphia, filaments more or less united. (The anthers free.)
XVII. Diadelphia, filaments forming 2 sets. (Flowers always papilionaceous.)
XVIII. Polyadelphia, filaments forming more than 2 sets.
XIX. Syngenesia, 5 stamens, the anthers united. (Compound flowers.)
XX. Gynandra, stamens arising from the germen or style, as in the Orchideae.
XXI. Monecia, stamens and pistils in different flowers on the same plant.
XXII. Diœcia, stamens and pistils distinct; the former confined to the flowers of one plant, the latter to those of another.
XXIII. Polygama, stamens and pistils in the same flower, or stamens only or pistils only; the whole on one plant or on different plants.
XXIV. Cryptogama, plants in whose fructification stamens and pistils cannot be perceived, or very imperfectly.
These Classes contain a number of Orders, founded on the following Characters.

In the first 13 Classes, they solely depend on the number of pistils, and are named Monogynia, Digynia, Trigynia, Tetragynia, Pentagynia, Hexagynia, Heptagynia, Octogynia, Enneagynia, Decagynia, Dodecagynia, and Polygynia.

In the 14th Class are two orders. 1. Gymnosperma; the seeds naked, and usually 4, never more. 2. Angiosperma; the seeds inclosed in a pericarp.

In the 15th Class there are two Orders. 1. Siliculosa, the shape of the fruit being that of a Silicula or pouch. 2. Siliquosa, the fruit forming a long pod or Siliqua.

In the 16th, 17th, and 18th Classes, the Orders are named from the number of stamens, and have the same names as the first 13 Classes.

In the 19th Class the Orders are five.

1. Polygynias equalis; all the florets perfect, having stamens and a pistil.
2. Polygynias superficia; florets of the disk perfect, those of the circumference with a pistil only.
3. Polygynias frustranea; florets of the disk perfect, those of the circumference with an abortive pistil, or none at all.
4. Polygynias necessaria; florets of the disk with stamens, those of the circumference with a pistil.
5. Polygynias segregata; "several flowers, either simple or compound, but with united anthers and a proper calyx, all included in one common calyx." Sm.

In the 20th Class the Orders are named according to the number of stamens, Monandria, &c. So also are those of the 21st and 22d Classes, except when there is a union of the filaments; the Orders are then named Monadelphia, &c.

In the 23d Class there are three Orders.

1. Monoeida; two or all the flowers characteristic of the Class found on the same plant.
2. Dioecia; two or all the flowers divided, and found on two separate plants.
3. Triecia; the three flowers on three separate plants.

The Linnean Orders of the 24th Class are,

1. Filices. 2. Musci. 3. Alga. 4. Fungi. Two others have been added by modern Botanists, viz. Hepaticae and Lichenes. These Orders form Natural Families, and have been farther subdivided by those who have made the natural affinities of plants their study. We shall now proceed to give a concise and general introduction to the Class Cryptogamia, and its Orders as adopted in the present work;—taking each Order in succession.

Cryptogamic plants differ from those of all the other Classes both in their structure and reproductive organs. In struc-
ture they are simply cellular, with the exception of the Filices, the Lycopodinae, the Marsiliaceae? and the Equisetaceae? Most of these certainly possess longitudinal vessels, and have been placed by some authors in the Monocotyledonous Class of the Natural System. In their reproductive organs, Cryptogamic plants differ in wanting stamens and pistils; and in their seeds being destitute of cotyledon, radicle, and plumule, but having the power of striking root indifferently from any part of their surface. Such seeds have received the name of sporules, (Sporulae) Spore, Gongyla, &c. It does not seem to be completely established that Ferns are furnished with true monocotyledonous seeds, though De Candolle and others support that opinion.

I. FILICES. Ferns.

Ferns constitute an extensive family, bearing their fructification mostly on the back of a frond, which frond, when considered in relation to the main stem, appears, in many cases, to be a true leaf. Some ferns have their fructification in spikes, (Pl. I. f. 8). Many ferns have a horizontal stem, creeping on the surface or beneath the soil, and throwing up the fronds, which, in most species, in the young state, are circinate, or rolled up in a beautiful manner; others have a large tuberous mass, more or less covered with chaffy scales and fibres, from which the stems or fronds arise. In some the stem is only a few lines long; but in certain exotic species sometimes 80 feet. There is nothing peculiar in the terms used to express the different kinds of ramification, form of the frond, &c.

That portion of the stem of a fern, from the commencement of the leafy part to the apex, is called the Radix. The surface of the stem may be

Chaffy (paleaceus), when covered with dry membranaceous scales.

Scaly (squamosus), when covered with foliaceous scales.

Hairy, villose, naked, prickly, smooth, &c.; these terms are used in the same sense as in other plants.

The fructification of ferns is mostly on the inferior surface, which has gained the greater number the name of Dorsiferous ferns (Filices dorsiferae).

The groups of capsules forming the fructification are called Sori, (Pl. I. f. 13), and are variously situated.

Sori are either naked, or protected by a membranaceous cover called an Involucrum or an Indusium, (Pl. I. f. 11, 12, 13). This is either

Flat (planum), when lying flat upon the capsules, Pl. I. f. 12.
INTRODUCTION TO THE

Peltate (peltatum), when more or less circular, and supported on a small central pillar.
Urceolate, (urceolatum), when resembling a cylindrical cup.
Scale-like (squamiiforme), when resembling scales.
Bivalve (bivalve), when divided into two parts, (Pl. I. f. 11. a section shewing one of the valves).
Continuous (continuum), when forming an uninterrupted line.
The involucre may burst outward (exterius dehiscens), in an opposite direction to the midrib: or burst inwards (interius dehiscens), towards the midrib.
The involucre may also be either single or double; the latter signifying that there is a cover on each side the sorus.
The capsules (thecae of some authors), are furnished with an elastic ligamentous ring (Annulus), (Pl. I. f. 14.), which surrounds them, or are destitute of it, (Pl. I. f. 8. 9). Groups of ferns are accordingly termed Annulata or Exannulata.
Those capsules possessed of the ligamentous ring, have their dehiscence produced by its elastic action, (Pl. I. f. 14).

II. LYCOPODINEÆ. Club-Mosses.
The plants which form this Order, are furnished with undivided small leaves, variously placed; no peculiar terms are employed in their description. The fructification is either axillary (at the inner base of a leaf, Pl. I. f. 6.), or in spikes; it is very small, and composed of roundish capsules, (Pl. I. f. 6.) which are 1–3-celled and 1–3-valved. These capsules have been called Conceptacles (Conceptacula), and Coques: they are of two kinds; the one containing a minute pulverulent mass of granules, (Pl. I. f. 7.), the other rather large corpuscles (Corpuscula). Both kinds are sometimes found on the same plant, and De Candolle supposes that one may be the means of fertilizing the other.

III. MARSILIACEÆ.
Very few plants are found in this Order. Their vegetation is various: they are at most a few inches high, and are more or less aquatic. In Isoetes the leaves resemble those of Litoricella lacustris, or a young Rush. The fructification of these plants is situated at, or very near, the root, (Pl. I. f. 4. Pilularia globulifera), and consists of a roundish involucre, not opening, and divided into 1–4 loculaments, (Pl. I. f. 5., In-
volucre of *Pil. globulifera*), containing small bodies, sometimes of different kinds. Some of these bodies have been called Anthers, and are superior; the others are Capsules, and filled with sporules, sometimes intermixed with very minute granules. In *Isoetes* the fructification is quite concealed, and contained within the very base of the leaf or frond, which only betrays its contents by being somewhat swollen at that part.

IV. EQUISETACEÆ. Horse-tails.

An Order, containing a single Genus, and which, as well as the two preceding Orders, were ranked by Linnaeus among the Ferns. These plants have a remarkable vegetation, being regularly articulated both in the stem and branches, each articulation arising from a tubular sheath. The branches are regularly whorled, and wholly destitute of leaves. The fructification is terminal, and forms an oblong spike, (Pl. I. f. 1.), on every side of which are arranged a number of peltate scales or disks, (Pl. I. f. 2.), with several sides or angles. From the inner surface of these scales, several wedge-shaped involucres project inwards, (Pl. I. f. 2. a), which burst longitudinally and discharge their contents. Each of these involucres was formerly called a Horn-like indusium. Their contents are not yet well understood. A number of green roundish bodies, supposed to be germs, (Pl. I. f. 3.), are surrounded by minute granules, and furnished at their base with 4 elastic filaments, incrassated at their apex; when moist, the filaments are twisted spirally round the whole, but when dry, they unroll and extend themselves. The incrassated extremities have been considered Anthers, and the minute granules Pollen by some, and naked Seeds by others. (Pl. I. f. 3., where the filaments are shown, and some of the granules adhering to them).

V. MUSCI. Mosses.

The mosses are very numerous, and are chiefly characterised by their seed-vessel being furnished with a lid (Operculum, Pl. I. f. 17. a. et f. 23. a.), which is protected by a veil, (Calyptra, Pl. I. f. 23. b.), in the manner of an extinguisher.

The Roots of Mosses are simply fibrous, and offer nothing peculiar.

The Stems (surculi), vary from less than a line to several feet in length, and are simple or branched, erect, creeping, pendulous, &c. The branches are variously arranged as in other plants, in a distichous, pinnate, bipinnate manner, &c. When
the stem is irregularly divided or branched, it is said to be
vague ramosus.

When the fruit of a moss is naturally terminal, if the stem
shoots past it, that shoot is called an innovation, and the fruit
is then said to be lateral from innovation.

The leaves are of two kinds, those of the stem called Cauline
leaves, and those immediately surrounding the fructification,
called Perichaetal leaves, (Pl. I. f. 25. a).

The leaves differ extremely in form, and frequent observa-
tion alone will enable the student to perceive their gradation,
and understand the compound terms frequently used to design-
ate them.

In direction they are imbricated, patent, squarrose, (the apex
somewhat curved downwards, or the leaves pointing both up-
wards and downwards), or secund.

They are mostly concave, sometimes carinate (when the sides
are more or less folded together, and the back becomes sharp);
sometimes plane.

The margin is plane, convolute, involute, or revolute, rec-
curved or incurved, and may be entire, ciliate, serrate, or (to-
wards the apex only) laciniate.

A leaf is said to be marginated when the margin is evidently
thickened, as in Bryum punctatum. Leaves either possess or
are destitute of a nerve. The nerve either reaches beyond the
point (Nervo excurrente), to the point exactly (Nervo percur-
rente), or stops short at a greater or less distance from it. When
the nerve is short, there are sometimes 2, and the end of a single
one is occasionally forked.

In regard to insertion, leaves are bifurious, trifarious, &c.,
or equal on every side of the stem; it may be added that they
are always alternate and always sessile.

The Seed-vessel of a moss is called a Theca or Capsule,
(Pl. I. f. 16, 17, 23.), and is either sessile or supported on a
fruit-stalk, (Seta).

When the theca is in a very young state, it is enveloped in
a membranaceous covering, which is at length divided trans-
versely into two portions: the upper and larger portion pro-
tects and partly covers the theca for a greater or less length
of time, and is called the Veil (Calyptra, Pl. I. f. 23. b.),
and furnishes important generic characters. When there is a
slit passing up one side, it is called a Dimidiate Calyptra, (Pl. I.
f. 23. b.); when entire at the base, or with several very short
crests, it is named a Mitriform Calyptra, (Pl. I. f. 24). The
surface is either even, striate, sulcate, smooth or hairy.

When the Calyptra is removed, the summit of the theca is
exposed, which (except in the genera Andrea, Phascum, (Pl. I.
f. 16. and Voitio) terminates in a deciduous lid (Opectulum, (Pl. I. f. 17. a. and f. 23. a). This is of various forms, obtuse, mammilllose, rostrate, obliquely rostrate, subulate, &c.

After the lid has fallen, we perceive the mouth (Stoma) of the theca: this in some mosses is surrounded externally by an elastic ring, (Annulus, Pl. I. f. 22. a a). The mouth is either quite naked (Pl. I. f. 17.) or furnished with a single row of teeth (Pl. I. f. 19. 22.), variously formed and modified; this row is often accompanied by a second of slender membraneous teeth (Pl. I. f. 21. b), which have sometimes slender processes (Cilia) between them. In a few instances the mouth is provided with only a conical, plicate membrane, (Pl. I. f. 20.), and in a solitary case, with nothing but a profusion of capillary filaments. Sometimes there is a horizontal membrane closing the mouth, even when teeth are present, as in the genus Polytrichum.

When the theca is divided longitudinally, a little pillar is perceived passing up the centre, this is the Columella.

The theca has, in many Mosses, a little swelling on one side at the base, which is named a Struma. When the theca is prolonged downwards (often also dilated), the appearance is termed an Apophysis; it is remarkably evident in the whole of the genus Splachnum. As a general rule, it may be observed, that any prolongation of the theca below the portion which contains the seeds, and which is at the same time evident externally, becomes an Apophysis.

The seeds of Mosses are called Sporules, (Pl. I. f. 18).

VI. HEPATICÆ. Liver-worts. Hepatic Mosses.

Most of the plants of this Order have a considerable affinity with the true mosses. Their structure is similar, being a simple cellular tissue, and their vegetation equally humble. Seven genera constitute the Order, and they differ so much from each other, that we shall touch slightly upon all.

1. Jungermannia. This genus has the nearest resemblance to the true mosses. The stems are simple or branched, and as they are either furnished with leaves or form a continuous frond, the species are divided into frondose (Pl. I. f. 32.), and foliose (Pl. I. f. 34.), Jungermanniæ.

The leaves in almost all the species are largely reticulated, and more or less pellucid: they are always sessile, sometimes decurrent, and often semi-amplexicaul. In form they are extremely various, being frequently many-cleft, and what is more striking, often divided into two unequal lobes, which are con-
duplicate or folded together. Those which contain at their base the bodies called Anthers, are called Perigonal leaves; those which surround the calyx, Perichetal leaves. In many species there are also minute leaves or leaf-like processes, arising from the inferior surface of the stem; these are called Stipules.

The seed-vessel (Theca) of the Jungermannia, which is destitute of an Operculum, divides, when mature, into 4 longitudinal valves, (Pl. I. f. 32. e.), and is supported on a delicate membranaceous peduncle, (Pl. I. f. 32. c). When very young, it is covered by a delicate veil, (Calytra, Pl. I. f. 32. b.), the whole being protected in almost every species by a single or double Calyx, (Pl. I. f. 32. a.), which varies in form, and furnishes excellent specific characters. When the theca has attained its full size, (Pl. I. f. 32. d.), it bursts the calytra, which remains at the base, and issues from the calyx, which usually encloses the calytra. Within the theca are the seeds (Sporules) intermixed with elastic spiral filaments, named Elateres, (Pl. I. f. 33.), which assist in their dispersion.

In most species, minute, spherical, membranaceous, reticulated bodies, supported upon short, white peduncles, have been discovered; they are situated in the axils of the perigonial leaves, (which do not differ from the rest in form), and are called Anthers, how properly we know not, but Dr Hooker, in his elaborate Monograph, has kept up the name.

2. Monocelea, (Hook. Musc. Exot.) contains a single species, resembling at first sight a frondose Jungermannia. There is no calyx, unless the membranaceous sheath included in the frond be considered one. (Hooker mentions a calyx in his generic character, but says "Calyx nullus" in the description). The theca issues from an orifice towards the apex of the frond, and is supported on a peduncle; it is of one valve. The spores are mixed with spiral filaments (Elateres).—An exotic plant.

3. Targionia, contains one species, which is frondose and lobed. There is a roundish, coloured involucre which arises from beneath the frond at the apex, and opens by 2 valves.

The seed-vessel (Theca) is concealed, and almost sessile within the involucre, globose, bursting at the apex, and discharging its seeds (Sporules) mixed with spiral filaments (Elateres).

4. Marchantia. Frondose plants of a close opake texture, deeply divided or lobed, (Pl. I. f. 26). The fructification is seated on a pedunculated receptacle, called a Common Receptacle of the Fructification; this receptacle is of two kinds; the one peltate, (Pl. I. f. 26. a.), containing several capsules (Thecae) on its under surface, (Pl. I. f. 26. b.), the other peltate also,
plane on the upper surface, with oblong bodies imbedded vertically in the disk, and which are supposed to be **Anthers**. In one British species the latter receptacle is sessile. The theca (Pl. I. f. 27. b.) have very short peduncles, and are protected before maturity by a veil, (Calyptra, Pl. I. f. 27. a.), which they at length rupture, but are not much protruded.

They contain seeds (**Sporules**) mixed with spiral filaments (**Elateres**).

Besides the two receptacles above mentioned, there is a third kind in the form of little open cups, sessile on the upper surface of the frond, and containing minute, green bodies (**Gemmae**), which have the power of producing new plants, as well as the sporules.

5. **Anthoceros.** Minute frondose plants, (Pl. I. f. 28). The seed-vessel (**Theca**) is linear, 2-valved, pedunculate, issuing from a calyx; when it bursts, the seeds (**sporules**) are seen attached to a central filament (**Columella**, Pl. I. f. 28. a, and f. 29.), and wholly unmixed with spiral filaments. On the frond are small cup-shaped receptacles, containing minute, spherical, pedunculated, reticulated bodies, which have been called **Anthers**. (!)

6. **Sphaerocarpus**, contains a single species. The whole plant is minute, and consists of a roundish or ovate, delicate, membranaceous frond, bearing on its disk a cluster of obpyriform receptacles, in each of which a globose, transparent, finely membranaceous seed-vessel, lies filled with minute sporules unmixed with filaments.

7. **Riccia**, (Pl. I. f. 30.). Minute frondose plants, not well understood, growing on moist ground, or floating on water. Fructification has only been found on one British species, and appears to consist of simple, roundish seed-vessels (**Theca**) immersed in the frond, tipped with a slightly exserted style, and containing minute sporules, (Pl. I. f. 31).

VII. **CHARACEÆ. Charas.**

A curious tribe composed of a single genus, wholly aquatic. **Roots** fibrous, fixed in the mud. **Stems** very slender, sometimes articulated, and in a few species furnished with a calcareous crust beneath the epidermis. There are no leaves, but whorls of short, simple or compound branches resembling the stem. There are two kinds of fructification; the first kind is a **Nucule**, (Pl. II. f. 1. a.), which is sessile, oval, solitary, spirally striated, having a membranaceous covering (**Involucre**?), and the summit indistinctly cleft into 5 segments, (the **Calyx**?).
The interior is filled with minute sporules. The few processes resembling short branchlets which accompany it, are named Bracteas, (Pl. II. f. 1. c). The second kind of fructification is a Globule, (Pl. II. f. 1. b.), or minute round body, of a reddish colour, composed externally of a number of triangular (always?) scales, which separate and produce its dehiscence. The interior is filled with a mass of elastic, transversely undulate filaments. The scales are composed of radiating, hollow tubes, partly filled with minute, coloured, spherical granules, which freely escape when the tubes are injured: their nature is wholly unknown, and I believe hitherto unnoticed.

VII. ALGÆ. Flags.

We can do nothing more than give a very general idea of the plants of this extensive Order. Most of them are aquatic, growing either in the sea or in fresh water. Their Roots are either fibrous, a mere fleshy or callous disk (a scutate Root), or altogether wanting. Some are wholly frondose, others support their frond on a stem (Stipes). The fronds are either cylindrical or plane, often expanded, sometimes little more than a mere membrane: the cylindrical ones are often finer than a human hair, the plane ones often several feet long, and broad in proportion. Besides these there are others which possess distinct leaves, as far as they are considered in relation to the stem or branches, but, from their usual connection with the fructification, are still called Fronds.

The seeds of these plants are named Sporules, sometimes Granules, and are variously situated, as, for example, in distinct Capsules or Thece, (Pl. II. f. 19, 20.), or in Tubercles, which are either free or imbedded in the frond, (Pl. II. f. 14, 15.), or in a leafy process of the frond, (Pl. II. f. 8). Sometimes the tubercles are imbedded in common receptacles, (Pl. II. f. 3. a). In a few instances there are naked granules surrounded by an open involucre, (Pl. II. f. 13). The seeds or granules are often naked, but immersed in the frond, (Pl. II. f. 7.); and it often happens that two kinds of fructification occur in the same species, viz. tubercles and naked seeds, but always on distinct plants. In several species the fructification assumes the form of a pod (Siliqua). A numerous tribe are tubular, and have their sporules scattered or arranged in some determinate manner in their interior, (Pl. II. f. 17, 18, 27, 28, 29).

Many Algae are articulated, (Pl. II. f. 26, 27, 28, 29.): the line of separation is then called a Joint, and the space between two joints an Articulation.
Another Organ remains to be mentioned. Many species possess Vesicles of different forms. The most common are regular inflations of particular parts of the frond, filled with air. They are supposed to be of use in keeping the frond afloat, (Pl. II. f. 5).

The substance of the Algae has a wide range. Some are perfectly membranaceous and pellucid, some little more than a gelatinous frond, others wiry, corneous, and elastic, while others again are coriaceous and subligneous. Almost every gradation of colour is also to be found among them, but the predominant ones are green, red, and brown.

IX. CHETOPHOROIDEÆ. Chetophoroids.

Few genera are found in this Order, which is proposed, in this work, to include certain plants differing very materially from the Algae. Some of them are found in the ocean, others in fresh water,—very few on moist ground, rocks, or trees. They are more or less gelatinous, almost all slippery to the touch, and generally more or less firm, some indeed very hard. They are chiefly of a roundish form, often solid, some with a central cavity; a few may be termed crustaceous. Within, most of the species possess simple or articulated filaments (Pl. II. f. 32. b, and f. 31. b, 33. b.), either radiating from the centre to the circumference (Pl. II. f. 32. b. 31. b), or lying without order in a gelatinous nidus (Pl. II. f. 33). Some consist almost entirely of sporules (Pl. II. f. 34. b).

X. LICHENES. Lichens.

An extensive Order, containing plants of a very humble growth, and widely remote from each other in habit. They are of various colours, wholly destitute of leaves, and of every intermediate substance between gelatinous and densely crustaceous. In form they are frequently determinate, a great number growing in a radiate and circular manner. A few species are quite pulverulent, (Pl. III. f. 19). Many resemble mere thin crusts, inseparable from the rocks or trees on which they grow, (Pl. III. f. 1.); some have a granulated surface, (Pl. III. f. 7. 8.) others are imbricated with foliaceous scales (Pl. III. f. 9.), or consist of free, lobed fronds (Pl. III. f. 4. 10.) while a considerable number resemble shrubs or corallines in miniature, and grow erect on the ground, or pendent from the trunks of trees, (Pl. III. f. 12. 13. 16. 17. 18.) The fructification is usually in the form of shields (Scutellæ) or tubercles.
In the description of the Lichens in this work, all terms have been as much as possible avoided, that might perplex the student. We shall here, however, give the principal part of the terminology established by Acharius, which is now universally used in Latin description.

The main substance of a Lichen is named Frond, or Thallus, or Universal Receptacle, \( (\text{Receptaculum universale}) \). The partial receptacle \( (\text{Receptaculum partiale}) \) is the Apothecium, or the part which immediately incloses the fructification and sporules \( (\text{Gongylæ, Sporulae, \\ &c.}) \), and, according to circumstances, is known by the common name of \text{Scutella, Shield} \ (\text{Pl. III. f. 8. a, f. 9. a})$, or \text{Tubercle} \ (\text{Pl. III. f. 4. a, f. 18. a})$. The regular and uniform shields or tubercles are the \text{Apothecia vera}, or, simply speaking, \text{Apothecia}. Other appearances, such as \text{Pulvinuli, Soredia, \\ &c.} are named Secondary Apothecia \( (\text{Apothecia accessoria}) \). There is little doubt that the latter are capable of reproduction.

\text{Podetium} is the name applied to those stalk-like processes of the thallus which bear the apothecia on their summit, \( (\text{Plate III. f. 12. a, and f. 13.}) \), as in the genus \text{Cenomyce}.

The \text{Podetia} are often cup-bearing, or scyphiferous \( (\text{dilated upwards into a cup, Scyphy, Pl. III. f. 12. b}) \).

\text{Cyphella} are pale tubercle-like spots, on the under surface of the thallus; as in \text{Sticta}, \( (\text{Pl. III. f. 10. a}) \).

\text{Lacuna} are small hollows or pits on the upper surface of the thallus, \( (\text{Pl. III. f. 10.}) \).

\text{Soredia} are little heaps or collections of free pulverulent bodies, mostly of a whitish colour, occurring on various parts of the thallus.

\text{Pulvinuli} are spongy, excrescence-like bodies, sometimes rising from the thallus, and often resembling minute trees, &c. as in \text{Parmelia glomulifera}.

\text{Nucleus proligerus} is a distinct cartilaginous body coming out entire from the apothecia, and containing the sporules.

\text{Lamina proligeræ} a distinct body containing the sporules, separating from the apothecia, often very convex and variable in form, and mostly dissolving into a gelatinous mass, \( (\text{Pl. III. f. 12. c, and f. 14. a}) \).

The root-like fibres arising from the margin and under surface of many lichens, are termed \text{Fibrilla}. They are very striking in the genus \text{Borrera}.

\text{XI. HYPOXYLA}.

This order was established by De Candolle, and includes several genera of plants formerly referred to the Lichens, (they
CLASS CRYPTOGRAMIA.

are so still by some botanists), and a great number of plants which he separated from the Fungi. At one extremity the Lichens pass into the Hypoxyla through Endocarpum, and at the other into the Fungi, through the carnose species of Xylaria, which in habit resemble the Clavarie and Geoglossa.

The Hypoxyla are divided into two sections; in the first of which the plants are mostly accompanied by a thin crust, like that of the Lichens, and do not discharge their sporuliferous pulp spontaneously, (Pl. III. f. 3.) In the second, there is no crust whatever, and the sporuliferous pulp is for the most part evidently discharged.

The Hypoxyla are chiefly suberos or corneous, and, with a very few exceptions, of a black colour. By far the greater proportion grow on the dead trunks and branches of trees, often bursting through, and partly concealed by the bark; a considerable number are found on the dead stalks of herbaceous plants, and living, dead, or dying leaves. A very few belong to rocks or the bare ground.

Almost all the Hypoxyla are furnished with spherules (Spherule), which contain the sporules and sporuliferous pulp. They are more or less of a roundish form, (Pl. IV. f. 37. 40.), and are either free and constitute the entire plant (Pl. IV. f. 37.), or seated on the surface of a corneous mass (the Receptacle or Stroma), or contained within it (Pl. III. f. 5. a, and Pl. IV. f. 42.)

When the spherules are furnished with an orifice, they are said to possess a Stoma or mouth. When there is no orifice, they are named Spherule astoma or mouthless spherules, (Pl. IV. f. 37.)

The mouth is often elongated, and then takes the name of Ostiolum, (Pl. IV. f. 40.) When the spherules are destitute of a receptacle, they are often so much imbedded in or beneath the bark, that the summit of their orifices are alone visible, like mere dots.

The Sporules are situated in the spherules, and are either naked or inclosed in slender hyaline tubes, called Thecae by some authors, (Pl. IV. f. 38.); the whole mostly lying in a whitish gelatinous pulp.

In the genus Xyloma, there are no spherules. The large confluent species have something like partial receptacles, bursting without regularity. They are in fact confluent Perithecia, as the smaller species, which have only one opening, have their covering so termed; though the name is not adopted by every one.

In the genera Opegrapha (Pl. III. f. 3.), and Hysterium (Pl. IV. f. 43.), there is only one covering, and as it can-
not be called a spherule, on account of its form, which is ob-
long or linear, it is also not improperly called a Perithecium. 
Their sporules are contained in slender hyaline tubes or thece,
(Pl. IV. f. 45.)

The genus Stilbospora is an anomalous one. It appears like
irregular, little, black, somewhat shapeless heaps, protruding
through the bark of dead branches of trees, with a tendency to
become effused. There are no spherules, but the sporules (spo-
ridia?) are naked, and intermixed with a black, minute sub-
stance, which may be eonsidered in the light of a receptacle. 
In Link's arrangement it is placed among the Epiphyta.

XII. FUNGI. Funguses.

An order of plants agreeing in fructification, though differ-
ing much in habit. Their structure is floccose (minutely fila-
mentous); in substance they are mostly earose, though some
are coriaceous, suberose, or almost woody; in colour extreme-
ly various, but very rarely green. They grow mostly on the
ground, some on trunks of trees, rotten wood, dead leaves, &c.
One or two are aquatic (at least have been found growing in
water). The whole plant, in a general point of view, seems
little more than a receptacle for the fructification.

The character of the Order, as derived from the fructifi-
tion, is defined by Link to be "sporules disposed in a series in
elongated tubular cells; the cells situated in some part of the
external surface."

The surface in which the fructification is situated, is named
the Hymenium, and is variously modified.

We shall now describe the parts of a common Agaric, which
is of more frequent occurrence than any other plant of the or-
der, (Pl. IV. f. 22.) The hollow base a, represented in the
Plate, from which the stem rises, is called a Wrapper (Volva).
In the young state it envelopes the whole plant, and is so eh-
arteristic as to separate Amanita from Agaricus. The stem
of all Fungi is called Stipes, and, in the present case, supports
a cap (Pileus, b). The pileus is provided on the inferior sur-
face with thin radiating expansions, constituting the Hyme-
nium: these expansions are termed Gills (Lamelle, Pl. IV.
f. 24. a), and are generally arranged in some determinate or-
der, depending on their relative lengths.

The lamellae are adnate with the stipes, when the extremities
next the stipes are united with it: when not united, they are
said to be free. When they are not only adnate, but carried
as it were more or less down the stipes, they become decur-
rent.
The internal substance of the pileus and stipes is termed the *Flesh*.

Many *Agarics* have a delicate fringe connecting the margin of the pileus, at a certain age, with the stipes (Pl. IV. f. 25.), or a ring-like collar surrounding the stipes (*Annulus*, Pl. IV. f. 22. c): this is called a Veil (*Velum*), and is either a general veil (*Velum universale*), when it is adnate with the surface of the pileus, but becoming obsolete in age, or it is a partial veil (*Velum partiale*), extending only from the margin of the pileus to the stipes. The annulus is a kind of veil, which is sometimes fixed to the stipes, at others free, and capable of being moved upwards and downwards.

The terms explained above are applicable to all *Fungi* which possess the parts so denominated.

The principal modifications of the *Hymenium* require to be briefly noticed.

In *Merulius* and *Cantharellus* it is composed of Veins or *Rugae* often anastomosing or running into each other. In *Boletus* (Pl. IV. f. 27.) it is formed of contiguous *Tubes*, separable from the pileus and from each other, (Pl. IV. f. 28.) In *Polyporus*, on the contrary (Pl. IV. f. 25.), it resides in mere *Pores*, not separable from the pileus or each other, (Pl. IV. f. 26.)

In *Hydnum* (Pl. IV. f. 29.), the hymenium is constituted of conical or subulate carnose spines (*Aculei*) on the inferior surface.

In some genera the pileus becomes a mere head (*Capitulum*, Pl. IV. f. 85.), and is nearly wholly occupied by the hymenium; in others the whole plant is nothing more than a filiform or clavate, simple or branched receptacle (Pl. IV. f. 30.), except a small portion at the base.

In *Peziza* (Pl. IV. f. 31, 32, 33, 34.), the pileus is more or less cup-shaped (*Cupuliform*), always so when young, sessile or stipitate, with the hymenium only on the upper surface or disk.

In *Thelephora* the whole external surface, which is mostly smooth, is occupied by it.

The genus *Phallus* is placed among the *Fungi* in this work, on account of its general habit; the fructification, however, does not at all agree with the Order. The pileus has a celllose surface, the cells being filled with dark green slime abounding with naked sporules. Link has arranged it with the *Gastromycei*, and considers the volva as a *Sporangium*, and the stipes as a *Columella*. This situation seems to be equally erroneous.
INTRODUCTION TO THE XIII. GASTROMYCI.

This Order contains plants whose sporules or sporidia (little bodies enclosing sporules) are included in one or more coverings (Peridia). The whole is termed by Link a Sporangium (Pl. IV. f. 17. 18. 21.) ; and it generally constitutes almost the entire plant.

In the young state many Gastromyci are soft, or even semifluid. Some are exceedingly minute, as the genus Erysiphe (Pl. IV. f. 21.) ; others very small, as Ecidium (Pl. IV. f. 11. 12.), and Physarum (f. 16.), &c. In the genus Erineum (Pl. IV. f. 14. 15.), there is a near approach to the plants of the following order. Bovista, Scleroderma, Geastrum, Lycoperdon (Pl. IV. f. 18.), &c. contain very large individuals.

The Peridium varies in form and in dehiscence; is mostly membranaceous, sometimes coriaceous, carnose, rarely obsolete. The genera Tremella and Tuber, which are solid, the one gelatinous, the other very firm, seem to want a peridium, or it must be considered as adnate with the substance of the plant; yet the whole plant may be properly termed a Sporangium, as the sporules are contained in its substance.

The sporangium is sometimes furnished with a Pedicel (Pl. IV. f. 17.), or a short stipes.

In many Gastromyci, the interior is more or less filled with woolly filaments (Flocci), intermixed with the sporules; and some have also a small central pillar, named Columella; others are destitute of both.

When the sporangium contains distinct bodies inclosing Sporidia, the sporangium is said to contain Sporangiola. This occurs, according to Link, in Tuber, Endogene, Pisocarpium, and Cyathus, (Pl. IV. f. 19. and 20.), to which we may add Erysiphe (Pl. IV. f. 21). If, however, the Sporidia should prove to be mere sporules, the Sporangiola will then become the Sporidia.

It remains to be mentioned, that the genera Uredo (Pl. IV. f. 9.), and Puccinia (f. 10.), will be found under this order in the present work, though they do not possess a true Peridium; the epidermis of the leaves on which they grow only assumes the appearance of one. They could not, however, be well separated from Ecidium (Pl. IV. f. 11. 12.), which has a true peridium, but with which, in other respects, they have a very strong affinity.
XIV. BYSSOIDEÆ.

All the plants belonging to this Order are filamentous, whether dark coloured and opake, or transparent and colourless, (Pl. IV. f. 3–8.)

The filaments (Flocci) are generally minute, simple, or branched, mostly tubular and articulated, and produce their fructification externally.

The Flocci are generally more or less tufted, and are termed Thallus by Link. Thus, the thallus is said to consist of flocci of such and such a character. When the flocci are composed of a number of articulations, resembling a series of beads, it is called moniliform, (Pl. IV. f. 7.)

The flocci sometimes are attached to, or clothe an elongated carnose body, as in the genera Isaria and Cephalotrichum. This body is called a Receptacle (Stroma).

The Sporidia (little, mostly transparent bodies containing sporules) are either scattered among the flocci (Pl. IV. f. 4.), or attached to particular parts of them (Pl. IV. f. 5. 6.), or arranged in a beaded series. They are generally round or oval, and very rarely divided into two or more dissepiments. Though they are called Sporidia, it rarely happens that the microscope is able to detect the included sporules; the student, therefore, must expect the sporidia to appear like mere sporules.

In a few instances regular sporidia seem to be wanting, but the articulations of the flocci separate spontaneously at the joints, and supply their space. In a few other cases, neither sporidia nor any mode of reproduction have been discovered.

XV. EPIPHYTEÆ.

Plants of the simplest structure, composed of nothing more than naked sporidia (Pl. IV. f. 1.), or sporidia mingled with a minute grumose or pulverulent mass. They grow on dead branches, or burst from the bark of trees or epidermis of leaves. The sporidia are sometimes divided into two or more dissepiments.

Link has brought Fusidium into this Order, but the flocci are so visible, that the plant resembles a minute Sporotrichum. He has also placed here Uredo and Puccinia, in which he is physiologically correct; but surely in error when he adds Aëci-
EXPLANATION OF THE PLATES.

(All the Figures are magnified except when the contrary is specified.)

PLATE I.

Fig. 1. A spike of *Equisetum sylvaticum*, nat. size.—2. One of the peltate scales removed. *a*, The wedge-shaped involucres.—3. One of the germs, with the elastic filaments.

4. A portion of a plant of *Ptilularia globulifera*, nat. size, with involucres.—5. An involucre vertically divided, showing the *anthers* at the top, and the capsules beneath.

6. Bracteal leaves of *Lycopodium selaginoides*, with the receptacles or coques.—7. Granules.

8. A portion of the spike of *Botrichium lunaria*, nat. size.—9. Two of the capsules, one of which has discharged its contents.

10. A portion of the frond of *Hymenophyllum Tunbrigense*, nat. size. 11. One of the 2-valved involucres vertically divided, showing the capsules attached to a cylindrical receptacle.

12. One of the pinulae of the frond of an *Aspidium*, with involucres or indusia—13. An involucre removed with some of the capsules exhibited.—14. A capsule burst open by the force of the elastic ring, and its contents discharged.—15. The sporules.

16. Capsule of a *Phascum*, shewing the union of the theca with the operculum.

17. Theca, illustrating the genera *Anictangium* and *Gymnostomum*; *a*, The lid or operculum.—18. The sporules.

19. Shews a single peristome.

20. The membranaceous, plicate peristome of *Diphyscium*.

21. A portion of a double peristome removed from the theca. *a* the outer, *b* the inner peristome.

22. Summit of the theca of a single-peristomed moss. *a a*, The *Annulus*, which occurs in some mosses.

23. Theca of a cylindrical form. *a*, The lid; *b*, The calyptra, which in this case is dimidiate, and smooth and even.

24. A mitriform calyptra, which in this case is sulcate and hairy.

25. A portion of the stem of a moss, with some cauline leaves. *a*, The perichaetial leaves, from which the seta is seen to arise.

26. A portion of the frond of *Marchantia conica*, nat. size, with a fertile receptacle of fructification. *a*, The receptacle; *b*, The capsules or thecae.—27. One of the capsules removed, with its calyptra. *a*, The calyptra; *b*, The capsule discharging its sporules and spiral filaments.
Fig. 28. A portion of a frond of an Anthoceros. *a*, The columella, or rather receptacle, to which the sporules are attached.—29. A small part of the receptacle with sporules.

30. A plant of Riccia glauca, nat. size.—31. Shews the manner in which the capsules are imbedded in the frond.


**PLATE II.**

Fig. 1. Fructification of the genus Chara. *a*, The nucule; *b*, The globule; *c*, The bracteas.—2. The nucule more highly magnified.

3. Segment of a frond of Fucus vesiculosus, nat. size. *a*, The receptacle in which the tubercles of the fructification are imbedded.—4. Granules and filaments contained in the tubercles.—5. The air-vesicles of the frond.

6. Segment of a frond of Delesseria alata, nat. size.—7. One kind of fructification, consisting of naked granules.—8. The second kind, a tubercle containing sporules.—9. The sporules or granules.

10. Part of a frond of Sphærococcus membranifolius, nat. size.—11. The tubercles, which are either sessile on the frond, or shortly pedicellate on the stipes or margin.—12. The granules.

13. Portion of a frond of Pilula plumosa, shewing the fructification naked at the base of an involucre.

14. Summit of a frond of Gigartina subfuscua, shewing the innate tubercles.

15. Segment of the frond of Gigartina purpurascens, with innate tubercles.

16. Portion of the frond of Ulva plantaginifolia, with granules.

17. Segment of the frond of Gloionema.

18. Do. of that of Bangia Laminaria.

19. Portion of a filament of Polysiphonia urceolata, with fructification.

20. Do. of Polysiphonia Brodiae with fructification.

21. Do. of Ceramium diaphanum, with fructification.

22. Do. of Calithamnion roseum, with fructification.

23. Do. of Ectocarpus littoralis, with immersed tubercles.

24. and 25. illustrate the vesicular fructification of the genus Vaucheria.

26. Filaments of an Oscillatoria.

27. Do. of Zygnema quinimum; two of the filaments united.

28. Filament of Conferva rivularis.

29. Do. of Conferva ericetorum.

30. Representation of Diatoma flocculosa. This genus, I conceive, with some other naturalists, to be of an animal nature.

31. Plant of Chaetophora elegans; *a*, nat. size. *b*, The filaments of which it is composed.

32. Linkia natans; *a*, nat. size. *b*, Filaments of which it is chiefly composed.

EXPLANATION OF PLATES.

Fig. 34. *Palmella rosea*, *a*, nat. size. *b*, The sporules.
35. *Echinella fasciiculata*, described by some botanists as vegetables, but I believe them to have an animal structure.

PLATE III.

Fig. 1 *Lecidea parasema*, nat. size. *a*, The shields or apothecia.
5. Portion of the thallus of *Porina pertusa*, nat. size. *a*, Exhibits a section of the thallus, and an inclosed spherule.
7. Young and mature apothecia of *Lecanora Perellus*, with a small portion of the crust-like thallus.
12. *Cenomyce coccyfera*, nat. size. *a*, The podetium; *b*, The cup or scypha; *c*, The fructification, (Lamina proliyera of *Acharius*).
15. A portion of the crust of *Isidium corallinum*, nat. size. *a*, Part of the same, shewing the fructification.
18. A portion of the thallus of *Usnea hirta*, nat. size. *a*, Represents a kind of tubercle, which is considered as fructification as well as the regular apothecia.
19. *Lepraria flava*.

PLATE IV.

Fig. 1. Illustrates the genus *Cylindrosporium*, which is composed of nothing but sporidia.
4. Illustrates the genus *Sporotrichum*.
5. Do. that of *Penicillium*.
6. Do. that of *Stachylidium*.
7. Do. that of *Monilia*.
8. Do. that of *Helmisporium*.
EXPLANATION OF PLATES.

Fig. 10. Illustrates that of *Puccinia*. *a–d*, Sporidia of different forms.
14. and 15. illustrate that of *Erineum*.
16. Illustrates that of *Physarum*, nat. size.—17. The same; one of the sporangia bursting.
21. Shews the genus *Erysiphe*. *a*, The sporangiola, or bodies containing sporidia (?).
22. Illustrates the genera *Amanita* and *Agaricus*, nat. size. *a*, Volva; *b*, Pileus; *c*, Veil, which is here annular.
23. Shews the manner in which a fibrous veil attaches the margin of the pileus to the stipes.
24. A portion of the pileus divided vertically, to shew the gills or lamellæ (*a*).
25. Illustrates the genus *Polyporus*.—26. A piece cut out, and turned up to shew the pores.
27. Illustrates that of *Boletus*, (smaller than nature).—28. Some of the tubes to shew that they separate from the pileus and from each other.
29. Illustrates that of *Hydnium*, (somewhat reduced). The section only of part of the pileus is given.
30. Illustrates that of *Clavaria*, nat. size.
31–34. Illustrate that of *Peziza*, nat. size; many are much larger, many much smaller.
36. Explains the genus *Spharia*, nat. size.—37. Spherules; one of them divided.—38. The tubular cells which contain the sporules.
39. *Cryptosphaeria acuta*, nat. size, the epidermis under which the spherules were concealed being removed.—40. A spherule mag. *ed.*
41. *Stromatosphaeria disciformis*, nat. size.—42. A plant divided to shew the immersed spherules, some of which are filled with the gelatinous sporuliferous pulp.
43. *Hysterium Fraxini*, nat. size.—44. A perithecium removed.—45. The tubular cells which contain the sporules.
ARRANGEMENT OF THE GENERA.

I. MONANDRIA.

I. MONOGYNIA.


(Chara belongs to Crypt.; Zostera to Monoc.; Valeriana rubra to Triand.; Alchemilla arvensis to Tetrand.)

II. DIGYNIA.

(Callitriche belongs to Monocia.)

II. DIANDRIA.

I. MONOGYNIA.

* Perianth double, inferior, monopetalous, regular.


** Perianth double, inferior monopetalous, irregular. *Seeds in a pericarp.*


*** Perianth double, inferior, monopetalous, irregular. *Seeds naked.*


**** Perianth double, superior.

Perianth single, or none.

9. Fraxinus. Cal. 0 or 4-cleft. Cor. 0 or 4-petalled. Caps. compressed, 2-seeded, with a foliaceous expansion. Flowers polygamous.—P. 2.


II. DIGYNIA.


III. TRIANDRIA.

I. MONOGYNIA.

* Flowers superior.


** Flowers inferior, glumaceous.

15. Schœnus. Cal. glumes 1-valved, imbricated on all sides, the outer ones sterile. Coroll. 0. Seed naked or with bristles at its base.—P. 9.


17. Eriophorum. Cal. glumes 1-valved, 1-flowered, imbricated on all sides. Coroll. 0. Seed with long silky hairs, springing from the base.—P. 12.


II. DIGYNIA.

* Calyx 1-flowered, (except in Arundo Phragmites).

† Corolla 1-valved.

ARRANGEMENT OF THE GENERA. xxxiii

†† Corolla 2-valved.


** Calyx 2- or rarely 3-flowered.

† Flowers perfect.

27. Aira. Cal. 2-valved, unequal. Coroll. 2-valved, outer one mostly awned. Florets with no intermediate or imperfect ones. Seed free.—P. 18.


†† Flowers polygamous.


*** Calyx many-flowered.

† Calyx 1-valved.


†† Calyx 2-valved.


33. Dactyliis. Valves of the calyx unequal, the larger one keeled. Coroll. 2-valved, awnless. Seed adnate with the hardened corolla.—P. 24.
ARRANGEMENT OF THE GENERA.

34. Festuca. Cal. valves opposite, unequal. Coroll. 2-valved, valves lanceolate, ext. one acuminate or awned.—P. 25.


36. Bromus. Coroll. 2-valved, valves lanceolate; ext. one, awned below the extremity; int. one fringed.—P. 27.

37. Avena. Coroll. 2-valved, valves lanceolate, firmly inclosing the seed; ext. valve with a twisted awn on the back.—P. 30.

38. Cynosurus. Cal. 2-5-flowered, accompanied by a pectinate involucre (proper receptacle, Sm.). Valves of the coroll. linear-lanceolate.—P. 25.

III. TRIGYNIA.


IV. TETRANORIA.

I. MONOGYNIA.

* Perianth double (both calyx and corolla).

† Flowers monopetalous, superior, 1-seeded.

40. Dipsacus. Involucre many-leaved. Cal. double, ext. one very minute; int. one cyathiform. Receptacle chaffy, spinous. Fruit angular, crowned with the calyx.—P. 34.

41. Scabiosa. Involucre many-leaved. Cal. double, int. one feathery or bristly. Receptacle chaffy or naked. Fruit crowned with the enlarged calyx.—P. 34.

†† Flowers monopetalous, superior, 2-seeded.

42. Galium. Coroll. rotate, 4-cleft. Fruit a dry nut, crowned with the calyx.—P. 35.

43. Asperula. Coroll. infundibuliform. Fruit not crowned with the calyx.—P. 35.

44. Sherardia. Coroll. infundibuliform. Fruit crowned with the calyx.—P. 34.

††† Flowers monopetalous, inferior, 2- or many-seeded.

45. Plantago. Coroll. 4-cleft, segments reflexed. Stam. very long. Caps. 2-celled, 2- or many seeded.—P. 37.

†††† Flowers with 4 petals.

46. Epimedium. Cal. 4-leaved, caducous. Pet. inferior, with
an inflated nectary on the upper side. *Pod* 1-celled, many-seeded.—P. 38.


**Perianth single.**


49. *Alchemilla.* Perianth inferior, 8-cleft, 4 outermost segments the smaller. *Fruit* 1-seeded, naked.—P. 39.

II. DIGYNIA.

(*Cuscuta* belongs to Pent. Digynia.)

III. TETRAGYNIA.


51. *Sagina.* Cal. 4-leaved. Coroll. 4-petalled. *Caps.* 1-celled, 4-valved.—P. 42.


(*Cerastium semidecandrum* belongs to Decand. Pentag.)

V. PENTANDRIA.

I. MONOGYNIA.

*Flowers* monopetalous, inferior, with 4 naked 1-seeded nuts.

† Orifice of the corolla naked.


†† Orifice of the corolla closed with scales.

‡ Nuts fixed to the bottom of the calyx.

57. *Borago.* Coroll. rotate, the orifice closed by five obtuse, emarginate teeth.—P. 46.

58. *Myosotis.* Coroll. hypocrateriform, the segments very obtuse, the orifice closed with short connivent scales.—P. 43.
59. Lycopsis. Coroll. infundibuliform, the tube curved, orifice closed with convex scales.—P. 47.

60. Anchusa. Coroll. infundibuliform, the orifice closed with convex scales. Nuts with a cavity at their base.—P. 45.

61. Symphytum. Coroll. ventricose, the orifice closed with subulate scales.—P. 45.

+ + Nuts fixed to a central columella.

62. Cynoglossum. Coroll. shortly infundibuliform, the orifice closed with convex scales. Nuts fixed to the base of the style.—P. 45.


** Flowers monopetalous, inferior. Seeds in a capsule.


72. Polemonium. Coroll. rotate, 5-partite. Stam. inserted upon the five valves enclosing the orifice of the corolla. Caps. 3-celled, 3-valved.—P. 50.


*** Flowers monopetalous, superior.

76. Samolus. Coroll. hypocrateriform, 5-lobed; lobes with small intermediate scales. Caps. half inferior, 1-celled, 5-valved towards the apex.—P. 55.


78. Lonicera. Coroll. irregular. Berry 1-3-celled; cells many-seeded.—P. 55.

**** Flowers 5-petalled, inferior (often only 4 in Euonymus).


80. Viola. Cal. 5-cleft, the segments produced at the base. Coroll. irregular, the upper petal spurred at the base. Anthers connate. Caps. 1-celled, 3-valved.—P. 51.

***** Flowers 5-petalled, superior.


82. Heder a. Cal. 5-toothed. Petals broader at the base. Style simple. Berry 5-seeded, crowned by the calyx.—P. 56.

****** Flowers incomplete. (A single perianth.)


II. DIGYNIA.

* Flowers monopetalous, inferior.

84. Gentiana. Coroll. campanulate or infundibuliform, tubular at the base, without nectiferous pores. Caps. 1-celled, 2-valved.—P. 60.

85. Cuscuta. Coroll. campanulate, 4-5-lobed. Caps. bursting all round transversely at the base, 2-celled; cells 2-seeded.—P. 60.

** Flowers incomplete. (A single perianth.)

86. Salsola. “Perianth single, inferior, 5-cleft, persistent, enveloping the fruit with its base, and crowning it with its broad scariose limb. Seed single, its cotyledon spiral.” Hook.—P. 59.

87. Chenopodium. Perianth single, inferior, 5-cleft, persistent, partly covering the seed. Seed 1, roundish.—P. 57.

88. Beta. Perianth single, half-inferior, 5-cleft, persistent.
Seed 1, reniform, imbedded in the fleshy base of the perianth.—P. 59.


*** Flowers 5-petalled, superior, 2-seeded (Umbellate).

A. Umbels irregular. Flowers forming a roundish head.


B. Umbels regular.

a. Fruit naked. (neither hairy nor bristly.)

* Umbels with a general and partial involucre, (Œnanthe and Sison often want a general one).


95. Sison. Involucre 1–4-leaved, (sometimes wanting). Fruit ovate, 3-ribbed on the back, the spaces between the ribs convex.—P. 62.

96. Bunium. Involucre rarely 1-leaved or wanting. Involucella many-leaved, setaceous. Petals subuniform. Fruit ovate-oblong, 5-ribbed. Ribs acute, the intervals between them tuberculate.—P. 63.

97. Conium. Involucella 3-leaved, all on one side. Petals subequal. Fruit ovate, 5-ribbed; Ribs obtuse, slightly crenulate, the intervals between them plane.—P. 63.

98. Thysellinum. Involucres reflexed. Petals subequal. Fruit plane, 3-ribbed on the back; Ribs obtuse.—P. 63.

99. Ligusticum. Involucres various. Petals mostly uniform. Fruit ovate-oblong, 5-ribbed; Ribs acute, with the intermediate spaces sulcate.—P. 64.

100. Angelica. Involucre sometimes wanting. Fruit subcompressed, 3-ribbed; Ribs acute, winged, the intermediate spaces sulcate.—P. 64.
101. **Sium.** Involucres mostly many-leaved. Fruit oval, subprismatic, and somewhat laterally compressed, 5-ribbed; ribs obtuse, the intermediate spaces subconvex.—P. 64.

102. **Heracleum.** Involucres deciduous. Flowers radiate. Fruit compressed, with a membranaceous margin, 3-ribbed on the back; ribs obtuse.—P. 65.

**Umbels with Partial Involucres only.**

103. **Phellandrium.** Involucres 0. Flowers all fertile, those of the disk smallest. Fruit ovate, smooth, crowned with the calyx and styles.—P. 66.

104. **Æthusa.** Involucres 0. Involucella 3-leaved, deflexed, all on one side. Fruit ovate, with 5 acute ribs.—P. 66.

105. **Cicuta.** Involucres almost always 0. Fruit ovate, with 5 ribs; the intermediate spaces prominent.—P. 66.

106. **Imperatoria.** Involucres 0. Fruit roundish, compressed, with a winged border, 3-ribbed; ribs obtuse, prominent, the intermediate spaces sulcate.—P. 67.

107. **Myrrhis.** Involucres 0. Fruit beaked at the apex, and crowned with the styles, 5-ribbed; ribs acute.—P. 67.

108. **Chelidonium.** Involucres almost always 0. Fruit oblong-conical, smooth, even, ribless.—P. 68.

***Umbels wanting both general and partial involucres.***

(Carum has a general one, and Apium Petroselinum both.)

109. **Apium.** Involucres 0, (except in A. Petroselinum). Petals uniform. Fruit ovate, 5-ribbed; ribs obtuse, the intermediate spaces plane.—P. 68.

110. **Carum.** Involucres 1-leaved. Petals subequal, obcordate, emarginate. Fruit ovate-oblong, 3-ribbed on the back; ribs obtuse, the intermediate spaces sulcate and striate.—P. 69.

111. **Pimpinella.** Involucres 0. Petals nearly equal, inflexed. Fruit ovate, glabrous, 5-ribbed; ribs obtuse, the intermediate spaces subconvex. Stigmas globose.—P. 69.

112. **Ægopodium.** Involucres 0. Petals unequal. Fruit ovate-oblong, 5-ribbed; spaces between the ribs subconvex. Stigmas simple.—P. 70.

113. **Smyrnium.** Involucres 0, or rarely 1-leaved. Fruit ovate-globose, with a black 3-ribbed coat. Seeds reniform, angular.—P. 70.
b. Fruit hairy or bristly.

* Umbels with a general and partial involucre.

114. **Torilis.** Involucre sometimes obsolete. Flowers equal. Fruit ovate, ribbed, everywhere clothed with bristles.—P. 70.

115. **Daucus.** Involucre pinnatisect or pinnate. Flowers subradiate. Fruit oval or oblong, 5-ribbed; ribs muri- cated, with intermediate bristles.—P. 71.

** Umbels with partial involucres only.

116. **Anthriscus.** Involucre rarely present. Fruit ovate, muricate or hispid, with a short glabrous beak; the styles persistent.—P. 71.

117. **Scandix.** Involucre 0. Fruit oblong, 5-ribbed, ending in a very long scabrous beak.—P. 72.

III. TRIGYNIA.

118. **Viburnum.** Cal. very short, 5-cleft. Coroll. monopet- lous, 5-lobed, the filaments inserted into its base. Berry inferior, 1-seeded.—P. 72.

119. **Sambucus.** Cal. with 5 minute teeth. Coroll. rotate, monopetalous, 5-lobed. Berry globose, inferior, 1-celled. 3-seeded.—P. 72.

(Stellaria media belongs to Decand. Trigynia.)

IV. TETRAGYNIA.

120. **Parnassia.** Petals 5. Nectaries 5, fringed with globular-headed filaments. Caps 1-celled, 4-valved.—P. 73.

V. PENTAGYNIA.

121. **Linum.** Coroll. 5-petalled. Caps. globose, 10-valved, 10-celled, Seeds ovate, compressed.—P. 74.

122. **Statice.** Cal infundibuliform, scarose, plicate. Coroll. 5-petalled. Seed 1, invested with the calyx.—P. 73.

VI. HEXAGYNIA.


VI. HEXANDRIA.

I. MONOGYNIA.

* Flowers with a double perianth, (both calyx and corolla).

124. **Berberis.** Cal. 6-leaved, inferior. Coroll. 6-petalled. Berry 2-seeded.—P. 82.

**Flowers issuing from a spatha.**

126. **Galanthus.** Perianth superior, 6-leaved, the 3 inner ones shorter, emarginate.—P. 75.

127. **Narcissus.** Perianth superior, 6-leaved. Nectary campanulate, including the stamens.—P. 75.

128. **Allium.** Perianth inferior, of 6 leaves, all ovate, sessile. (Flowers umbellate.)—P. 75.

***Flowers with a single corolla-like perianth. Not spathaceous.***

129. **Convallaria.** Perianth inferior, 6-cleft. Berry 3-celled. Stigma trigonous.—P. 77.

130. **Hyacinthus.** Perianth inferior, tubular, 6-cleft, or 6-partite. Stamens uniform. Caps. 3-celled.—P. 76.

131. **Asparagus.** Perianth inferior, 6-partite. Berry 3-celled. Stigmas 3.—P. 77.

132. **Narthecium.** Perianth inferior, of 6 patent leaves. Stamens hairy. Seeds appendiculate at each extremity.—P. 77.

133. **Ornithogalum.** Perianth inferior, 6-leaved. Stamens dilated at the base.—P. 76.

****Flowers with a single calyx-like perianth. Not spathaceous.***


135. **Luzula.** Perianth 6-leaved, glumaceous. Caps. superior, 3-celled, 3-valved; cells 1-seeded. (Leaves plane, mostly pilose.)—P. 81.

(**Peplis Portula** belongs to Div. *. Several Polygona to Octand. Trigyn.)

II. TRIGYNA.

136. **Triglochin.** Perianth single, of 6 deciduous leaves, three inserted above the rest. Caps. 3–6, united by a longitudinal receptacle.—P. 84.

137. **Rumex.** Perianth single, 6-leaved. Seed 1, triquetrous, covered by the three inner valviform leaves of the perianth.—P. 82.

III. POLYGYNIA.

138. **Alisma.** Cal. 3-leaved. Coroll. 3-petalled. Caps. many, clustered, distinct, 1-seeded, indehiscent.—P. 85.
ARRANGEMENT OF THE GENERA.

VIII. OCTANDRIA.

I. MONOGYNIA.

*Perianth double, (Calyx and corolla.)*

139. **Acer.** Cal. 5-cleft, inferior. Coroll. 5-petalled. Caps. 2, each with a long membranous expansion, 1-celled, 1-seeded.—P. 88.

140. **Epilobium.** Cal. 4-partite, superior, deciduous. Coroll. 4-petalled. Caps. elongated, 4-celled, 4-valved, many-seeded.—P. 85.


142. **Erica.** Cal. 4-leaved. Coroll. monopetalous. Caps. 4-celled, 4-valved; dissepiments from the middle of the valves.—P. 87.

143. **Calluna.** Cal. double, each 4-leaved, inner one coloured. Caps. 4-celled, 4-valved; dissepiments opposite the margin of the valves.—P. 88.

**Perianth single, corolla-like.**

144. **Daphne.** Perianth single, corolloid, inferior, 4-cleft. Berry 1-seeded.—P. 88.

DIGYNIA.

(Several Polygona occur, which belong to the following Order. Chrysosplenium and Scleranthus to Decandri. Digynia.)

II. TRIGYNIA.

145. **Polygonum.** Perianth single, corolloid, inferior, 5-partite. Fruit a 1-seeded nut.—P. 89.

III. TETRAGYNIA.


147. **Paris.** Cal. 4-leaved. Coroll. 4-petalled. Berry 4-celled, 4-seeded, superior.—P. 91.

IX. ENNEANDRIA.

I. HEXANDRIA.

148. **Butomus.** Perianth single, corolloid, 6-partite. Caps. 6, many-seeded.—P. 93.
X. DECANDRIA.
I. MONOGYNIA.

* Flowers polypetalous.

149. Pyrola. **Cal.** 5-cleft. **Coroll.** 5-petalled. **Anth.** opening with 2 pores. **Caps.** 5-celled, superior.—P. 92.

* Flowers monopetalous.

*(Vaccinium Myrtillus and uliginosum belong to Ocotand Monog.)*

II. DIGYNIA.

150. Scleranthus. **Perianth** single, monophyllous, 5-cleft, with the stam. inserted upon it. **Caps.** 1-celled, covered by the perianth.—P. 94.

151. Saxifraga. **Cal.** 5-partite. **Coroll.** 5-petalled. **Caps.** with 2 beaks, 2-celled, many-seeded.—P. 93.

152. Chrysosplenium. **Perianth** single, 4–5-cleft, subcorrolloid. **Caps.** with 2 beaks, many-seeded.—P. 93.

153. Saponaria. **Cal.** monophyllous, tubular, 5-toothed, without scales at the base. **Petals** 5, clawed. **Caps.** oblong, 1-celled.—P. 95.

154. Dianthus. **Cal.** monophyllous, tubular, 5-toothed, with imbricated scales at the base. **Petals** 5, clawed. **Caps.** cylindrical, 1-celled.—P. 95.

III. TRIGYNIA.

155. Arenaria. **Cal.** 5-leaved. **Petals** 5, undivided. **Caps.** 1-celled, many-seeded.—P. 98.

156. Adenarium. **Cal.** 5-leaved, urceolate at the base. **Petals** 5, undivided, inserted as well as the stam. into the base of the 1-celled **Caps.**. **Filaments** with a gland on each side at the base.—P. 98.

157. Stellaria. **Cal.** 5-leaved. **Petals** 5, deeply cloven. **Caps.** 1-celled, opening with 6 teeth, many-seeded.—P. 97.

158. Silene. **Cal.** monophyllous, tubular, 5-toothed. **Petals** 5, clawed, limb mostly notched or bifid. **Caps.** 3-celled, 6-toothed, many-seeded.—P. 96.

IV. PENTAGYNIA.

159. Sedum. **Cal.** 4–7-cleft. **Coroll.** 5-petalled. **Caps.** 5, with a nectiferous scale at their base.—P. 100.

XI. DODECANDRIA.

I. DIGYNIA.

165. Agrimonia. Cal. 5-cleft. Petals 5, inserted upon the calyx. Pericarps in the bottom of the calyx.—P. 105.

II. TRIGYNIA.


TETRAGYNIA.

(Potentilla Tormentilla, belongs to Icosand. Polyg.)

III. DODECAGYNIA.


XII. ICOSANDRIA.

I. MONOGYNIA.


(Crataegus Oxyacantha, belongs to Ord. Pentagynia.)
(Crataegus Oxyacantha, Pyrus Aucuparia, and Aria occur sometimes with 2, 3, or 4 styles, but belong to Ord. Pentagynia).
II. PENTAGYNIA.


172. SPIREA. Cal. inferior, 5-cleft. Coroll. 5-petalled. Pericarps 3-12, 1-celled, 3-valved; cells 1-3-seeded.—P. 110.

III. POLYGNYIA.

173. ROSA. Cal. fleshy, urceolate, 5-cleft at its summit. Pericarps many, hairy, included in the cal. Receptacle villous.—P. 111.

174. RUBUS. Cal. 5-cleft, inferior. Fruit a cluster of many 1-seeded juicy drupes.—P. 114.

175. FRAGARIA. Cal. 10-cleft, inferior, segments alternately smaller. Coroll. 5-petalled. Pericarps inserted upon a large pulpy juicy deciduous receptacle.—P. 115.

176. POTENTILLA. Cal. 8-10-cleft, inferior, segments alternately smaller. Coroll. 4-5-petalled. Pericarps roundish, fixed to a small dry receptacle.—P. 116.

177. GEUM. Cal. 10-cleft, inferior, alternate segments minute. Coroll. 5-petalled. Pericarps with a long geniculated awn. Receptacle oblong.—P. 118.

178. COMARUM. Cal. 10-cleft, inferior, segments alternately smaller. Pet. 5, less than the cal. Pericarps inserted on a large, permanent, spongy, villous receptacle.—P. 118. (SPIREA FILIPENDULA and ULMARIA belong to Ord. PENTAGYNIA).

XIII. POLYANDRIA.

I. MONOGYNIA.

* Petals 4.


imbedded in a spongy substance, which fills the pod.—P. 119.

** Petals 5.

182. Helianthemum. Cal. 5-leaved, 2 smaller than the rest. Coroll. 5-petalled. Caps. 1-celled, 3-valved.—P. 121.

183. Tilia. Cal. 5-partite, deciduous. Coroll. 5-petalled. Pericarp coriaceous or 5-celled; cells 2-seeded, (rarely 1-celled and 1-seeded).—P. 121.

*** Petals numerous.

184. Nymphaea. Cal. 4–5-leaved. Pet. numerous, inserted upon the germen beneath the stamens. Berry many-celled, many-seeded.—P. 120.

185. Nuphar. Cal. 5–6-leaved. Pet. numerous, inserted with the stamens upon the receptacle. Berry superior, many-celled, many-seeded.—P. 120.

II. PENTAGYNIA. (Styles 2–6).

186. Aquilegia. Cal. 5-leaved, deciduous, coloured. Pet. 5, terminating below in a spurred nectary.—P. 121.


(Reseda Luteola belongs to Dodecand. Trig. Helciborus to Ord. Polyg.)

III. POLYGYNIA.

* Pericarps indehiscent, 1-seeded.

188. Thalictrum. Perianth single, 4–5-leaved. Pericarps without awns.—P. 123.


** Pericarps dehiscent, many-seeded.

194. Trollius. Cal. 5 or many-leaved, petaloid. Pet. 5 or many, minute, tubular at the base. Pericarps cylindrical. (Hook).—P. 127.


XIV. Didynamia.

I. Gymnospermia.

* Calyx 5- or 10-cleft, subregular.

196. Leonurus. Cal. 5-angled. Anthers sprinkled with shining dots.—P. 183.


201. Betonica. Upper lip of Coroll. plane, ascending, lower one 2-lobed; the tube cylindrical.—P. 131.

202. Lamium. Upper lip of Coroll. vaulted, entire, lower one 2-lobed, toothed on each side.—P. 130.


204. Stachys. Upper lip of Coroll. vaulted, lower one 3-lobed, the 2 lateral lobes reflexed. Stam. after flowering laterally reflexed.—P. 132.


** Calyx 2-lipped. (Verbena belongs to Ord. Angiosp.)

207. Scutellaria. Upper lip of the Cal. covering the fruit like an operculum.—P. 134.


209. Prunella. Filaments forked at their apex, one of the points bearing the anther.—P. 134.

210. Origanum. Calyces and Bracteas collected into a spiked cone. Upper lip of Coroll. straight, notched.—P. 133.
211. Clinopodium. Bracteas many, linear, under each Cal. Upper lip of Coroll. erect, emarginate.—P. 133.

II. ANGIOSPERMIA.

* Calyx 4-cleft.


** Calyx 5-cleft.


*** Calyx 2-leaved.

XXV. TETRADYNAMIA*.

I. SILICULOS A.

223. Cakile. Pouch of 2 single-seeded articulations; upper one with an erect sessile seed; lower one with a pendulous seed, (sometimes abortive).—P. 139.


225. Thlaspi. Pouch compressed, emarginate; the valves carinate, (often winged), many-seeded. Filaments without teeth, distinct. Cal. unequal in its insertion.—P. 139.

226. Leptidium. Pouch with 1-seeded cells, their valves carinate. Petals equal.—P. 139.


228. Subularia. Pouch oval, pointless, many-seeded; valves turgid. Cotyledons incumbent, linear, bipartite.—P. 141.

229. Draba. Pouch entire, oval; valves plane or slightly convex; cells many-seeded. Seeds not margined; cotyledons accumbent. Filaments without teeth.—P. 141.


II. SILIQUOSA.

231. Cardamine. Pod linear, with the margins truncated; valves plane, nerveless (often bursting elastically), narrower than the dissepiment.—P. 142.


* The characters of the genera of this Class are those of Mr R. Brown. The terms used cannot be better explained than in the words of Dr Hooker. "The embryo being surrounded by no albumen, offers itself to examination immediately upon breaking open the external coat of the seed, and the distinction between accumbent and incumbent cotyledons will be apparent. In the former case, the back of one of the cotyledons is applied to the curved radicle; in the latter, the edges or margins of the cotyledons are applied to it.


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**XVI. MONADELPHIA.**

**I. PENTANDRIA.**


(*Linum* belongs to Pent. *Pentag*. *Geranium pusillum* to Ord. *Decand*).

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* The only plant of this genus growing near Edinburgh, was unaccountably omitted in the body of the work. It is


*Plant* with a smell like garlic when bruised; 1-3 feet high, erect, smooth, somewhat shining. *Leaves* large, veined. *Flowers* white. *Pods* narrow, long. The *stem* is often tinged with purple.
ARRANGEMENT OF THE GENERA.

II. DECANDRIA.

244. Geranium. Monogynous. Fruit beaked, separating into 5 1-seeded capsules, each with a long naked simple awn.—P. 149.

(Oralis belongs to Decand. Pentag.)

III. POLYANDRIA.


XVII. DIADELPHIA.

I. HEXANDRIA.


II. OCTANDRIA.


III. DECANDRIA. (Papilionaceous Flowers).

* Stamens all connected or monadelphous, the tube often cleft above.

250. Genista. Cal. 2-lipped; upper one with 2, lower one with 3 teeth. Standard reflexed.—P. 154.

251. Ulex. Cal. 2-leaved, with 2 scales at the base. Legume turgid, scarcely longer than the calyx.—P. 155.

252. Anthyllis. Cal. inflated, inclosing the roundish 1-3-seeded legume.—P. 155.


** Stamens diadelphous, 9 united and 1 free.

† Style more or less pubescent beneath the stigma.

254. Orobus. Style linear, cylindrical, downy above. Cal. obtuse at the base.—P. 156.

255. Lathyrus. Style plane, downy above, dilated upwards. Cal. with 2 upper segments shortest.—P. 156.

256. Vicia. Style bearded beneath the stigma.—P. 157.
ARRANGEMENT OF THE GENERA.

257. Ervum. Stigma capitate, everywhere pubescent.—P. 158.

†† Style glabrous.

* Legume more or less completely 2-celled.

258. Astragalus. Legume 2-celled, more or less gibbous. Style glabrous.—P. 159.

** Legume somewhat articulated.

259. Ornithopus. Legume jointed, curved, cylindrical.—P. 158.

*** Legume 1-celled, 1- or many-seeded, not jointed.

260. Medicago. Legume falcate or spirally twisted, compressed, membranaceous.—P. 163.

261. Trifolium. Legume mostly shorter than the cal., 1- or many-seeded, indehiscent, deciduous. Flowers mostly capitate.—P. 159.

262. Lotus. Legume cylindrical, straight. Wings of the coroll. cohering by their upper edge.—P. 162.

XVIII. POLYADELPHIA.

I. POLYANDRIA.


XIX. SYNGENESIA.

I. POLYGAMIA AEQUALIS.

* Corollas all ligulate. Semiflosculosi.


265. Cichorium. Involucre surrounded with foliaceous scales. Receptacle naked or slightly hairy. Pappus sessile, shorter than the pericarp.—P. 171.


271. Lactuca. Involucre imbricated, cylindric; its scales membranaceous at their margins. Receptacle naked. Pappus simple, stipitate.—P. 166.


** Corollas all tubular, and forming a hemispherical head. Capitate.

274. Arctium. Involucre globose, the scales hooked at their extremity. Receptacle chaffy. Pappus simple.—P. 171.


(Centaurea Jacea belongs to Polyg. Frustranea.)

*** Corollas all tubular, erect, forming nearly a level top. Discoidae.


**II. POLYGAMIA SUPERFLUA.

* Ray of the Corolla obsolete. Discoidae.


(Tussilago Farfara and Petasites belong to Sect. **).

* Corollas of the ray ligulate. Radiati.

282. Bellis. Involucrum hemispherical, the scales equal. Receptacle naked, conical. Pappus 0.—P. 182.

283. Matricaria. Involucrum hemispherical or nearly plane, imbricated; scales with membranaceous margins. Receptacle naked, subcylindrical. Pappus 0.—P. 181.


(Bidens cernua belongs to Ord. 1. Sect. ***).

III. POLYGAMIA FRUSTRANEA.

293. Centaurea. Involucrum scaly. Receptacle brISTLY. Corollas of the ray infundibuliform, irregular, longer than those of the disk. Pappus simple.—P. 182.
XX. GYNANDRIA*.

I. MONANDRIA.

* Anther adnate, nearly terminal, persistent. Pollen-mass composed of angular granules elastically cohering; fixed by its base.


296. Habenaria. Coroll. ringent. Lip spurred at the base beneath. Glands of the stalks of the pollen-mass naked, distinct, the cells of the stalks adnate or separated.—P. 185.

** Anther parallel with the stigma. Pollen-mass farinaeous, or composed of angular granules, fixed to the stigma by its extremity.


*** Anther terminal, (persistent in Epipactis, deciduous in Corallorrhiza.)

298. Epipactis. Lip ventricose below, undivided or 3-lobed; middle lobe the largest, connected as it were by a joint. Pollen farinaeous.—P. 186.


XXI. MONOECIA.

I. MONANDRIA.


* The characters of the Orchideous genera are those established by Mr R. Brown, and also given in Hooker’s Fl. Scotica.
(Chara belongs to Cryptog. Characeæ.)

**II. TRIANDRIA.**


304. **Carex.** Flowers with an involucre at their base of 1 glumaceous scale, forming an imbricated catkin. Barren Fl. Perianth 0.—Fertile Fl. Perianth simple, urceolate, ventricose, persistent, including a triquetrous nut. Stigmas 2—3.—P. 189.

305. **Typha.** Flowers forming cylindrical dense spikes. Receptacle with pappus-like hairs. Barren Fl. Perianth 0. Stam. 3, united below into 1 filament. Fertile Fl. Perianth 0. Pericarp pedicellate.—P. 188.

**III. TETRANDRIA.**


**PENTANDRIA.**

(Fagus sylvaticus, and Quercus, belong to Ord. Polyand.)  
(Atriplex portulacoides, to Polygamia.)

**HEXANDRIA.**

(Quercus belongs to Ord. Polyand.)

**IV. POLYANDRIA.**


V. MONADELPHIA.

318. Pinus. Barren Fl. in a catkin; its scales peltate. Anth. 2, sessile, 1-celled. Perianth 0.—Fertile Fl. in an ovate catkin; scales closely imbricated, 2-flowered. Perianth 0. Pericarp 1-seeded, with a winged expansion, covered by the scales which form a cone.—P. 204.

(Typha belongs to Ord. Triandria).
XXII. DIOECIA.

MONANDRIA.

(Salix Lambertiana belongs to Ord. Diandria.)

I. DIANDRIA.


II. TRIANDRIA.


(Valeriana dioica belongs to Triandria; Salix triandra to Ord. Diand.)

TETRANDRIA.

(Urtica dioica belongs to Monandria.)

III. PENTANDRIA.


(Salix pentandra belongs to Ord. Diand.)

IV. OCTANDRIA.


V. ENNEANDRIA.


(Empetrum belongs to Ord. Triand.)
ARRANGEMENT OF THE GENERA.

DECANDRIA.
(Lychnis dioica belongs to Decand. Pentag.)

ICOSANDRIA.
(Rubus Chamæmorus belongs to Icosand. Polyand.)

POLYANDRIA.
(Stratiotes aloides belongs to Polyand. Pentag.; Populus nigra to Ord. Octand.)

VI. MONADELPHIA.

325. Juniperus. Barren Fl. Scales of the catkin subpeltate. Perianth 0. Stam. 4–8, 1-celled.—Fertile Fl. Scales few, at length fleshy, united and surrounding the 3-seeded berry.—P. 211.

XXIII. POLYGAMIA.

I. MONOECIA.


XXIV. CRYPTOOGAMIA.

I. EQUISETACEÆ.

Char.—Fructification in terminal spikes, composed of peltate, several-sided scales, producing on their under surface 4–7 elongated involucres, containing the seeds.

327. Equisetum.—Obs. The only genus in this Order; a repetition of character, is therefore unnecessary. All the species are destitute of leaves, the stems rigid, jointed, each articulation arising from a sheath. Branches whorled.—P. 213.

II. MARSILIACEÆ.

Char.—Fructification radical. Seeds contained in roundish, 1- or many-celled, indehiscent involucres. Plants aquatic.

328 Pillularia. Involucres solitary, globose, nearly sessile, 4-celled.—P. 215.
III. LYCOPODINEÆ.

Char.—Fructification axillary or spiked, composed of two kinds of 1–3-celled, 2–3-valved capsules, some containing minute granules, others a few larger corpuscles. Stems herbaceous or woody, simple or branched, erect or creeping. Leaves undivided, small, numerous.


IV. FILICES.

Char.—Fructification uniform. Capsules mostly in clusters on the back of a frond, sometimes spiked or racemed; naked, or protected by a membranaceous involucre. Fronds mostly furnished with a stem, circinate when young, simple or variously branched and divided.

Div. I. Capsules without a ring. Fructification raised on a peduncle.


Div. II. Capsules furnished with an elastic ring, and produced on the back of the frond.

* Sori linear.

332. Blechnum. Sori linear, longitudinal, continuous, on each side the main rib. Involucre continuous, opening interiorly.—P. 217.

333. Pteris. Sori linear, continuous, marginal. Involucre formed by the inseted margin of the frond.—P. 218.

334. Scolopendrium. Sori linear, transverse, scattered. Involucre double, one on each side the sorus.—P. 218.


** Sori in round clusters.

336. Aspidium. Sori roundish, scattered. Involucres umbilicated or opening on one side.—P. 220.

337. Polypodium. Sori roundish. Involucres 0.—P. 222.
V. MUSCI.

Char.—Fructification double; either capsules (theca) furnished with a mostly deciduous lid, which is protected for a greater or less length of time by a deciduous membranaceous calyptra;—or minute spherical, pedicellated bodies, concealed in the axils of some of the leaves (Anthers?).

Div. I. Peristome 0.

* Lid persistent.

338. Andrea. Theca 4-valved; valves cohering at the apex, and adnate with the persistent lid.—P. 223.

339. Phascum. Theca entire, adnate with the persistent lid. Calyptra shorter than the theca.—P. 225.

** Lid deciduous.


Div. II. Mouth of the theca furnished with a peristome.

A. Peristome single.

* Calyptra mitriform. (In Splachnum at length dimidiate.)


** Calyptra dimidiate.

349. **Tortula.** *Seta* terminal. *Peristome* single, of 32 filiform, twisted teeth, nearly free, or more or less united by a tubiform membrane. *Calyptra* dimidiate.—P. 231.

350. **Didymodon.** *Seta* terminal. *Peristome* single, of 16 teeth or 32 in pairs, or united at the base. *Calyptra* dimidiate.—P. 244.

351. **Dicranum.** *Seta* terminal. *Peristome* single, of 16 teeth or 32 in pairs, or united at the base. *Calyptra* dimidiate.—P. 244.


B. *Peristome* double.

* *Seta* terminal.

354. **Polytrichum.** *Seta* terminal. *Peristome* double; outer one of 32 or 64 equidistant incurved teeth; inner one of a dense horizontal membrane, connected with the outer teeth. *Calyptra* dimidiate.—P. 245.


356. **Funaria.** *Seta* terminal. *Peristome* double, oblique; outer and inner ones each of 16 teeth, opposite to each other.—P. 247.

357. **Orthotrichum.** *Seta* terminal. *Peristome* mostly double; outer one of 16 teeth, approaching in pairs; inner one of 8–16 ciliary processes or none. *Calyptra* mitriform. *Columella* not capitate.—P. 247.

358. **Bartramia.** *Seta* terminal. *Theca* subglobose. *Peristome* double; outer one of 16 teeth; inner one of a membrane cleft into 16 bifid segments. *Calyptra* dimidiate.—P. 252.

359. **Bryum.** *Seta* terminal. *Peristome* double; outer one of 16 teeth; inner one of a membrane cut into 16 equal segments, with filiform processes often placed between them. *Calyptra* dimidiate.—P. 265.

** *Seta* lateral.

360. **Hypnum.** *Seta* lateral. *Peristome* double; outer one of 16 teeth; inner one of a membrane cut into 16 equal segments, with filiform processes often between them. *Calyptra* dimidiate.—P. 253.
361. Hookeria. Seta lateral. Peristome double; outer one of 16 teeth; inner one of a membrane cut into 16 entire segments. Calyptra mitriform.—P. 253.

362. Fontinalis. Seta lateral. Peristome double; outer one of 16 teeth; inner one of 16 ciliary processes, formed by transverse bars into a reticulated cone. Calyptra mitriform.—P. 251.

363. Anomodon. Seta lateral. Peristome double; the first of 16 teeth; the second of 16 ciliary processes, arising from the teeth. Calyptra dimidiate.—P. 250.

364. Neckera. Seta lateral. Peristome double; outer one of 16 teeth; inner one of 16 ciliary processes, connected only at the base by a short membrane. Calyptra dimidiate.—P. 251.

VI. HEPATICÆ.

Char.—Plants of a cellulose texture, opake or transparent. Fructification double; 1st, Capsules without a lid, either naked, and sessile and enclosed in a dehiscent involucre, sessile or imbedded in the frond with a terminal pore: or furnished with a veil, which they rupture at the apex, and through which they are more or less protruded on a peduncle. Sporules naked or mixed with spiral filaments. 2dly, Very minute, roundish or oblong, reticulated, free or immersed bodies variously situated. (Anthers?).—Jungermannia has a 4-valved theca. Monoclea a 1-valved, pedunculate theca. Targionia a 2-valved sessile involucre. Marchantia several thecae in a common pedunculated receptacle. Anthoceros a linear, 2-valved theca. Sphaero carpus obpyriform, sessile receptacles. Riccia im- mersed roundish thecae.

365. Jungermannia. Theca 4-valved, supported on a peduncle longer than the calyx; valves free.—P. 270.

366. Marchantia. Theca on the under surface of a common, peltate, pedunculate receptacle. Anthers imbedded in the disk of distinct, peltate, pedunculate or sessile receptacles.—P. 279.

367. Riccia. Theca "spherical, immersed in the frond (not opening?), crowned with the style, which is alone protruded." Hook.—P. 280.
VII. CHARACEÆ.

Char.—Plants aquatic, leafless, filiform; branches whorled. Fructification double: a minute, sessile, solitary, spirally striated nucule, enveloped in a delicate membrane, obsoletely 5-cleft at the apex, and filled with sporules; and a solitary inferior globose globule, whose coat is composed of scales fitted to each other, and which ultimately separate, the interior filled with elastic whitish filaments.

368. Chara.—The only genus in this Order. Stems sometimes articulated?; in certain species incrusted with a calcareous matter, which renders the plant very fragile.

VIII. ALGÆ.

Char.—Plants frondose, almost all aquatic, either floating free in the water, or attached by a fibrous or scutate base. Fronds cylindrical or plane, of every intermediate substance between gelatinous and lignosocoriaceous, and equally variable in colour. Fructification, granules or sporules, naked and immersed in the frond, or in capsules or tubercles variously situated, and sometimes in a common receptacle.

A. Frond not articulated.

Div. I. Plants marine, cylindrical or expanded, mostly olive-green or reddish brown, becoming black on exposure to air, of a coriaceous or cartilaginous substance. Fructification naked sporules immersed in the frond, or sporules in tuberculated receptacles. Fucoidae.


373. Lichina. Fronds minute, tufted, greenish black when growing. Fructification, solitary tubercles, with a pore, at length scutelliform.—P. 286.

374. Furcellaria. Frond cylindrical. Fructification concealed in the swollen extremities of the frond; capsules in the centre (Agardh), and pyriform granules in the circumference.—P. 286.


Div. II. Plants marine, cylindrical or plane, of a purplish, reddish, or fine rose-colour, becoming more brilliant on exposure to air. Substance gelatinous, membranaceous, or cartilaginous. Root scutate. Fructification, tubercles or naked immersed granules, often both in the same species, but on distinct individuals. Florideae.


381. Delesseria. Root scutate. Frond plane, membranaceous, with or without ribs. Fructification double; tubercles and clusters of naked immersed granules.—P. 292.

382. Sphaerococcus. Root scutate. Frond submembranaceous, or cartilaginous. Fructification uniform, tubercles or capsules.—P. 294.

383. Odonthalia. Root scutate. Frond linear, membranaceous, toothed. Fructification double; marginal slen-
der pods, containing a double row of granules, and axillary clusters of pedicellate, urceolate capsules.—P. 296.


Div. III. Plants chiefly marine, some, however, growing in fresh water, and on moist rocks. Fronds plane, or tubular and continuous, gelatinous, membranaceous or subcoriaceous. Colour mostly green or purplish, annular, some red or brown. Fructification internal granules, or granules naked and immersed in the substance of the frond, or adnate tubercles. Ulvoideae.

* Fronds plane.

385. Zonaria. Root downy. Frond plane, ribless, flabelliform or wedge-shaped, or linear and dichotomous. Fructification adnate tubercles, collected into parallel lines on the frond.—P. 297.


** Fronds tubular.

+ Fronds not appearing beaded or jointed internally.

387. Fistularia. Root scutate. Frond green, simple or branched, tubular, membranaceous. Fructification naked immersed granules distributed in fours throughout the frond.—P. 300.


390. Bangia. Filaments capillary, mostly simple, tubular, continuous. Fructification, granules disposed in regular transverse series or strata.—P. 301.

+ + Filaments appearing to be beaded, or more or less divided internally by false articulations.

391. Scytonema. Plant not gelatinous, coriaceous. Filaments short, forming dark, dense tufts; beaded internally, or filled with annular transverse bodies.—P. 302.

392. Oscillatoria. Plant gelatinous. Filaments simple,
continuous, membranaceous, filled internally with transverse parallel striae.—P. 303.

393. **Vaginaria.** Plant gelatinous. Filaments of two kinds; the larger ones sheathing a number of smaller ones which radiate as soon as protruded from the sheath. *Interior* with obsolete, or no transverse striae.—P. 305.

**Div. IV.** Plants marine, fresh water or terrestrial. Fronds capillary, tubular, continuous, membranaceous, of a green colour. Fructification very minute sporules, diffused in an internal gelatinous mass, or external viviparous (?) vesicles. Vaucherideae.

394. **Vaucheria.** Filaments dichotomous or irregularly branched, somewhat rigid. Fructification, a granulated mass within the frond, and external dark green vesicles variously situated.—P. 305.


B. Fronds filiform articulated.

**Div. V.** Plants marine, with few exceptions. Frond filiform or capillary, membranaceous or subcoriaceous, mostly of an olive-green or fine red colour. Fructification external tubercles or capsules, and occasionally innate ones at the ends of the ramuli. Ectocarpideae.

* Fronds more or less of a red colour.

396. **Asperocaulon.** Frond much branched, the main stem hirsute, opake, inarticulate. Branches jointed. Fructification double; capsules and lanceolate pods containing rows of granules.—P. 307.

397. **Polysiphonia.** Filaments jointed, longitudinally striated with internal parallel tubes. Fructification double; ovate capsules and granules in swollen branchlets.—P. 308.

398. **Ceramium.** Filaments jointed, subdichotomous, red; articulations veined or diaphanous. Fructification, capsules with an involucre of short ramuli.—P. 310.

399. **Callithamnion.** Filaments jointed, rose-red, branched. Articulations marked with one broad tube-like line, the joints pellucid. Fructification pedunculated capsules on the ramuli.—P. 311.

400. **Griffithsia.** Filaments jointed, fine red, branched. Fructification granules, surrounded with a gelatinous
limbus, and protected by a filamentous involucre.—P. 312.

**Fronds olive-green or brownish.

401. Cladostephus. Plant olivaceous. Main filaments opake, inarticulate; branches jointed, mostly whorled with rami.

402. Sphacellaria. Filaments jointed, branched, olivaceous, distichous or dichotomous; apex of the branches sphacellate or hyaline, abrupt. Fructification, granules in the sphacellated apex or capsules.—P. 313.

403. Ectocarpus. Filaments jointed, much branched, fuscous. Fructification, lanceolate pods or ovate capsules, solitary or racemose.—P. 314.

Div. VI. Marine and fresh water plants of various colours, mostly green. Filaments jointed, simple or branched, tubular, membranaceous or gelatinous. Fructification very minute sporules within the articulations. Confervoideæ.

404. Conferva. Filaments uniform, jointed, membranaceous, simple or branched, mostly green. Fructification, granules scattered in the articulations.—P. 315.

405. Zygnema. Filaments jointed, at length forming lateral unions by short tubes, passing from one to another. Fructification minute internal granules, assuming some determinate form or arrangement.—P. 320.


IX. CHÆTOPHOROIDEÆ.

Char.—Plants growing in the sea, fresh water or on rocks, moist ground, &c. Chiefly of a roundish form, some few almost crustaceous; solid, or with a central cavity, slippery to the touch, mostly very firm. Interior more or less gelatinous, and containing simple or branched, somewhat continuous or articulated filaments, either radiating from the centre to the circumference, or disposed without order; rarely granules only.

408. Chætophora. Plant elongated or globose, gelatinous; substance composed of branched articulated filaments.—P. 321.
ARRANGEMENT OF THE GENERA.

409. Linkia. *Plant* elongate or globose, gelatinous; *substance* composed of straight, radiating, simple acuminate filaments.—P. 322.

410. Nostoc. *Plant* roundish or shapeless, gelatinous; *substance* composed of curved moniliform simple filaments, lying irregularly in a gelatinous nidus.—P. 322.

411. Palmella. Minute or small, somewhat diaphanous, gelatinous plants filled with solitary granules, unmixed with filaments.—P. 323.

X. LICHENES.

Char.—Small or minute rootless plants, growing on the trunks of trees, or on the ground; of various colours and forms, either merely pulverulent, crustaceous, membranaceous, frondose, or branched and shrub-like. The whole may be considered as a general receptacle of the fructification, which consists of very minute sporules, enclosed in a partial receptacle (shield, tubercle, &c.), or scattered in powdery masses on the surface. Substance friable, corneous, coriaceous, membranaceous, or gelatinous.

Div. I. *Apothecia* differing in colour from the rest of the plant, and formed of a distinct substance. Idiothalami.

Sect. I. *Apothecia* simple, entirely formed of a subuniform, pulverulent or cartilaginous substance. Homogenii.

* Apothecia destitute of a raised margin.

412. Spiloma. *Plant* crustaceous, spreading, plane, adnate uniform. *Apothecia* composed of minute bodies, collected into a compact, homogeneous, subpulverulent, naked and shapeless coloured mass.—P. 324.

** Apothecia with a raised border.

413. Lecidea. *Plant* various; crustaceous, spreading, adnate and uniform, or foliaceous. *Apothecia* scutelliform, sessile, surrounded by a cartilaginous membrane, the disk of the same nature as the raised border.—P. 324.

414. Calicium. *Plant* crustaceous, plane, spreading, adnate uniform. *Apothecia* cup-shaped, sessile or stipitate, cartilaginous, containing a compact pulverulent mass, plane or convex, and forming a naked disk.—P. 328.
415. **Gyrophora.** Plant foliaceous, coriaceous or cartilaginous, peltate, mostly monophyllous, free beneath. *Apothecia* subscutelliform, sessile or adnate, covered with a black cartilaginous membrane, the disk warty or plaited in circles, and bordered.—P. 328.

**Sect. II.** *Apothecia subsimple, included, formed of a single covering, containing a capsular body or nucleus. Heterogenii.*

416. **Endocarpon.** Plant crustaceous, adnate, of some determinate figure, or foliaceous and peltate. *Apothecia* globose, concealed in the substance of the plant, surrounded by a thin membrane, furnished with a slightly prominent orifice, and containing a nucleus.—P. 329.

**Div. II.** *Apothecia partly formed from the substance of the plant. Cenothalami.*

417. **Thelotrema.** Plant crustaceous, cartilaginous, plane, spreading, adnate, uniform, with wart-like receptacles, furnished with a wide pore, and bordered. *Apothecia* included, and containing a nucleus within a double covering.—P. 330.

418. **Variolaria.** Plant crustaceous, plane, spreading, adnate, uniform. *Apothecia* wart-like, formed from the crust, (resembling soredia), submarginate, white, including a naked nucleus.—P. 330.

**Sect. II.** *Apothecia scutelliform, subsessile, the disk of a peculiar colour, different from the border which is formed from the crust. Discoidel.*

419. **Urceolaria.** Plant crustaceous, spreading, adnate, uniform. *Apothecia* shield-like, the disk concave, coloured, immersed in the crust, border formed from the crust, and the same colour.—P. 330.

420. **Lecanora.** Plant crustaceous, spreading, adnate, plane, uniform. *Apothecia* shield-like, thick, adnate and sessile, the disk plano-convex, coloured, border thickish, somewhat free, formed from the crust and the same colour.—P. 331.

421. **Parmelia.** Plant foliaceous, between coriaceous and membranaceous, spreading, appressed, orbicular, lobed and stellate, variously divided, fibrous beneath. *Apothecia* shield-like, attached by a central point, the disk
ARRANGEMENT OF THE GENERA.

concave, coloured, with a border formed from the crust.
—P. 335.

422. Borrera. Plant cartilaginous, branched and laciniate, the segments free, channelled beneath, and ciliate at the margin. Apothecia shield-like, with a coloured disk, the border formed from the frond.—P. 339.

423. Cetraria. Plant cartilagineo-membranaceous, ascending or spreading, lobed, smooth and naked on both sides. Apothecia shield-like, obliquely adnate with the margin, the disk coloured, plano-concave, border indexed, derived from the frond.—P. 340.

424. Sticta. Plant foliaceous, coriaceo-cartilaginous, spreading, lobed, free and pubescent beneath, with little cavities or hollow spots. Apothecia shield-like, fixed by a central point, the disk coloured, plane, border formed from the crust.—P. 341.

425. Peltidea. Plant foliaceous, coriaceous, spreading, subadnate, lobed, with woolly veins beneath. Apothecia orbicular, adnate, on produced portions of the frond, the disk coloured, border very thin, formed from the frond.—P. 342.

426. Evernia. Plant branched, laciniate, angular or compressed, suberect or pendulous, with a central filament within. Apothecia shield-like, sessile, the disk concave, coloured, border formed from the frond.—P. 342.

Sect. III. Apothecia subglobose, terminating the branches or podetia, or scattered, sessile and immarginate.

Cephaloidei.

* Apothecia covered by the mass of fructification.

427. Cenomyce. General receptacle subcartilaginous, foliaceous, laciniate, subimbricated, free, (rarely adnate, unform or wanting). Apothecia on podetia, orbicular immarginate, at length capituliform, bearing thick coloured masses of fructification.—P. 342.


429. Isidium. Plant crustaceous, plane, spreading, adnate, uniform. Apothecia on very short, solid podetia, orbicular, convex, solid, terminal, the disk subimmersed, having a border formed from the substance of the podetia.—P. 346.

430. Stereocaulon. Plant shrubby, cartilaginous, branched. Apothecia turbinate, sessile, solid, plane above, at length
subglobose, with a border formed from the frond.—P. 347.

** Apothecia clothed with the substance of the frond, and containing a pulverulent mass.


Div. III. Apothecia entirely formed of the substance of the frond, and of a similar colour. Homothalami,

432. Alectoria. Plant cartilaginous, subfiliform, fibrous and somewhat fistulose within, branched, prostrate or pendulous. Apothecia shield-like, thick, sessile, bordered, wholly formed from the frond.—P. 348.


434. Cornicularia. Plant cartilaginous, fibrous and nearly solid within, branched, shrubby. Apothecia orbicular, terminal, obliquely peltate, at length convex, somewhat inflated, the border dentate.—P. 349.


436. Collema. Plant subgelatinous, homogeneous, crustiform, foliaceous, or somewhat branched, membranaceous or cartilaginous when dry. Apothecia shield-like, bordered, formed from the substance of the frond, the disk sometimes differing in colour when dried.—P. 350.

Div. IV. Lichens destitute of Apothecia, and whose fructification is unknown. Athalami.


XI. HYPOXYLA.

Char.—Plants whose fructification is enclosed in perithecia or spherules, of an oblong, globular, or subirregular form, mostly of a corneous substance and black colour, solitary or imbedded in a receptacle, in
a few genera only, accompanied by a lichenoid crust. Sporules mostly in slender tubular cells, lying in a gelatinous pulp; the whole in most instances spontaneously discharged by a pore at the apex.

**Div. I. Plants accompanied by a crust.** Fructification enclosed in perithecia of a black colour. Sporuliferous pulp not spontaneously emitted. Pseudo-Lichenes.

438. Opegrapha. Receptacle crustaceous, thin, adnate. Perithecia oblong or linear, black, sessile, or somewhat immersed, having a longitudinal disk-like cleft.—P. 352.


* Spherules or perithecia with a stipitate, simple or branched receptacle.

441. Rhizomorpha. Receptacle much branched, elongated, coriaceous or ligneous. Perithecia arising from the branches, mostly clavate, dehiscent at the apex.—P. 354.

442. Xylaria. Receptacles stipitate, carnose or suberose. Spherules immersed in the receptacle, and containing a gelatinous sporuliferous mass.—P. 355.

** Spherules or perithecia with a sessile receptacle, or naked and sessile.

443. Stromatospharia. Receptacle sessile, free or bursting from beneath the bark of dead wood. Spherules immersed.—P. 355.

444. Cucurbitaria. Spherules tufted, free, fixed on a receptacle, rarely at first included. Receptacle bursting through the bark.—P. 359.

445. Cryptospharia. Receptacle 0. Spherules scattered or aggregate, lying beneath the epidermis or bark, orifice various, more or less exserted.—P. 359.

446. Sphæria. Receptacle 0. Spherules sessile on the surface, or slightly immersed.—P. 363.

448. **Nemaspore.** *Receptacle 0.* Spherules obvious or somewhat obsolete, discharging a sporuliferous pulp through the bark in the form of tendrils.—P. 365.

449. **Phacidium.** *Receptacle 0.* Perithecia sessile, depressed, bursting from the centre towards the circumference in several acute segments. Sporuliferous cells elongated, fixed.—P. 366.

450. **Stilbospora.** Black. *Receptacle 0?* or a pulverulent mass, intermixed with naked sporidia, the whole bursting through the bark, in the manner of a Stromatospheria.—P. 366.

451. **Hysterium.** Perithecia mostly oblong, black, corneous, bursting by a longitudinal slit. Sporuliferous tubes erect. (Crust none).—P. 366.

452. **Xyloma.** Black, corneous. Perithecia single, solitary and minute, or united and confluent, irregularly dehiscent.—P. 369.

453. **Asteroma.** Black, minute, epiphyllous. *Receptacle radiate,* filamentous, very adnate, at length tuberculated here and there.—P. 368.

**XII. FUNGI.**

Char.—Plants whose fructification consists of sporules arranged in a series in tubular cells, placed in some part of the external surface, thence termed the hymenium. Substance various, mostly carnose. Hymenium chiefly in the form of lamellae, tubes, pores, veins, subulate processes, a cellular head, a concave disk, or covering a clavate receptacle.—Growing mostly on the ground or on trunks of trees.

**Div. I.** Plants with a pileus or cap. Hymenium composed of straight radiating lamellae. **Agaricoideæ.**

454. **Amanita.** Pileus with a central stipes and volva. Stipes with an annular veil, or naked.—P. 369.

455. **Agaricus.** Pileus with a stipes, or fixed by its side. Volva 0.—P. 369.

**Div. II.** Pileus stipitate, sessile, resupinate or effused. Hymenium obtuse, subparallel veins, or irregular, sinuous folds. **Cantharellideæ.**

456. **Cantharellus.** Hymenium veined. Veins dichotomous, subparallel; sometimes anastomosing.—P. 396.

457. **Merulius.** Hymenium veined. Veins flexuose or forming very irregular pores. Plants sessile, resupinate or effused.—P. 397.
Div. III. Pileus stipitate or sessile. Hymenium sinu-ous: either irregular sinuosities of the same sub-
stance as the pileus, or anastomosing lamellæ, forming
eelongated and very flexuose pores.

458. Dedalea. Hymenium sinuous, composed of anastomos-
ing lamellæ or flexuose, elongated pores.—P. 398.

Div. IV. Hymenium more or less regularly tubular or
porous. Boletoideæ.

459. Polyporus. Hymenium porous, not separable from the
substance of the pileus nor the pores from each other.
Pores sometimes lacerating in age. Pileus very rarely
with a central stipes.—P. 398.

460. Boletus. Hymenium tubular. Tubes separable from
the substance of the pileus and from each other. Pileus
always with a central stipes.—P. 403.

Div. V. Hymenium composed of interrupted, tooth-like
lamellæ.

461. Sistotrema. Pileus carnose, irregularly stipitate. Hy-
menium composed of dentate, interrupted lamellæ—
P. 405.

Div. VI. Plants stipitate, sessile or resupinate. Hy-
menium consisting of soft, subulate spines.

462. Hydnum.—Character the same as that of the division.

Div. VII. Plants effuso-reflexed or resupinate, rarely
somewhat stipitate and laciniate. Hymenium an ex-
panded, warty or papillose, smooth or minutely hairy
surface.

463. Thelephora. Plant, with very few exceptions, more or
less adnate, thin, coriaceous, very rarely infundibu-
iform. Hymenium covering the outer surface.—P. 406.

464. Merisma. Sessile or substipitate, compressed, coriaceous,
branched, laciniate, apex often pilose. Hymenium on
both surfaces, confluent with the stipes or base.—P. 411.

Div. VIII. Plants erect, filiform or clavate, simple or
branched, carnose. Hymenium, smooth, occupying
mostly more or less of the whole surface.

465. Clavaria. Plants carnose, cylindrical, simple or branch-
ed. Hymenium smooth, occupying almost the whole
surface, confluent with the stipes.—P. 412.
ARRANGEMENT OF THE GENERA.

466. Phacorhiza. *Hymenium* clavate or filiform, cylindric-al, more or less confluent with the stipes. *Stipes* arising from a radicular tuber.—P. 415.


**Div. IX.** *Pileus* and *stipes* distinct. *Hymenium* on the outer surface of the *pilus*, which is either even, undulated, or furnished with large cells. *Helvelloideae.*

468. Leotia. *Pileus* ovate-conical or orbicular, wholly occupied by the *hymenium*; the margin free but closely embracing the *stipes*.—P. 416.

469. Helvella. *Pileus* submembranaceous, irregular, smooth on each surface, deflexed at the sides. *Hymenium* occupying the whole outer surface.—P. 417.

470. Morchella. *Pileus* lacunose, confluent with the *stipes* either at the margin or a little above it. *Hymenium* occupying the whole outer surface.—P. 417.

471. Phallus. *Stipes* issuing from a *volva*. *Pileus* furnished with large cells, filled with a sporuliferous slimy substance.—P. 418.

**Div. X.** *Plants* of various sizes, sessile or stipitate, more or less cup-shaped, (always so when young). *Hymenium* occupying the superior surface or disk.

472. Peziza. *Pileus* mostly carnose, sessile or stipitate, more or less cup-shaped, at length sometimes plane. *Hymenium* occupying the disk.—P. 418.


**XIII. GASTROMYCI.**

**Char.**—*Plants* whose sporules are protected by one or more, mostly membranaceous or coriaceous coverings, forming a sporangium, which frequently constitutes the entire plant. In a young state often soft and pulpy. Form mostly roundish or oblong; sessile or stipitate.

**Obs.** In *Tremella, Tuber, Sclerotium,* and *Tubercularia,* the covering or *peridium* is indistinct or obsolete, but the sporules are enclosed in the plant; and in *Uredo* and *Puccinia,* the epidermis of the leaf forms a pseudo-peridium.
Div. I. Plants of a soft gelatinous substance, mostly uniform, solid, even or variously folded. Sporules imbedded throughout the substance or towards the surface.

474. Tremella.—The only genus in the division, the character of which will suffice.

Div. II. Parasitic plants produced under the epidermis of vegetables (chiefly the leaves), and bursting through it. Sporidia never mixed with filaments.

475. Puccinia. Epidermis of the leaf forming a pseudo-peridium. Sporidia fixed by a pedicel, one or many-celled.—P. 428.


477. Æcidium. Peridium membranaceous, bursting through the epidermis, and dehiscent at the apex, with a dentate or lacerate orifice. Sporidia.—P. 444.

Div. III. Plants sessile or pedicellate, all minute, more or less globular (except in Erineum), membranaceous or gelatinous. Sporidia not mixed with filaments.

478. Stilbium. Minute. Stipes slender, bearing a little round solid head, which is pellucid and semifluid at first, at length more dense and opake.—P. 448.

479. Pilobolus. Stipes or receptacle pellucid, watery. Peridium a roundish vesicle, bursting elastically, placed on the apex of the receptacle.—P. 448.

480. Ascophora. Peridium membranaceous, stipitate, bursting, at length turned inside out, convex and subpersistent. Pedicel simple or branched, tubular, pellucid, articulated.—P. 448.

481. Mucor. Peridium membranaceous, globose, stipitate, pellucid, at length opake. Pedicel simple or branched, tubular, articulated.—P. 448.

482. Erineum. Peridium flocciform, subdiaphanous, various, subsimple, aggregato-caespitose, parasitic on living leaves. Sporules sometimes, but rarely, evident.—P. 449.

Div. IV. Plants sometimes of an indeterminate form, but generally globose or oval. Sessile or stipitate. Peridium membranaceous or coriaceous. Sporules intermixed with filaments.

* Minute or small plants. Peridium delicate in most instances, and generally fugacious.


485. Reticularia. Pulpy when young, effused, irregular; at length with a subfibrous, uneven surface. Interior membranaceous, crowded with fragile cells, containing a profusion of minute sporules.—P. 452.

486. Lycogola. Sessile, globose or subirregular, pulpy when young. Peridium single, fragile, variously dehiscent. Sporules mixed with a few filaments.—P. 452.

487. Diderma. Minute, subglobose. Peridium double, the outer one fragile and fugitive. Sporules mixed with a few filaments, and surrounding a roundish columella.—P. 453.

488. Leocarpus. Minute. Peridium single, fragile, bursting, sessile or substipitate, containing a black mass of sporules mixed with a few filaments. Columella 0.—P. 453.


490. Trichia. Minute, subglobose or irregular. Peridium single, membranaceous, bursting. Filaments involute, attached to the base, and expanding elastically.—P. 454.


492. Arscyria. Mostly cylindrical. Peridium fugacious, except a small portion at the base. Filaments abundant, reticulated, fixed at the base; sporules intermixed.—P. 455.

493. Stemonites. Cylindrical or subglobose. Peridium fugacious. Filaments forming a reticulated mass, perforated by the stipes to which they are attached; sporules intermixed.—P. 455.

** Plants large. Peridium thicker, between membranaceous and coriaceous, more durable, often warty.

495. Lycoperdon. Sporangium globose. Peridium single, membranaceous, scaly with warts or soft spines, bursting irregularly at the apex, and containing a mass of sporules and filaments.—P. 456.

496. Scleroderma. Sporangium globose or prolonged into a stipes. Peridium single, coriaceous, mostly warty, bursting at the apex or subindehiscent. Sporules collected into little contiguous distinct globules, mixed with filaments.—P. 457.

497. Bovista. Sporangium globose. Peridium double, the outer one adnate, cracking, somewhat fugacious; inner one bursting at the apex, and containing a mass of filaments and pedicellated sporules.—P. 458.

Div. V. Sporangium cyathiform, or very minute and globular. Peridium carnose or coriaceous, enclosing lenticular or oval bodies.

498. Cyathus. Cyathiform, at first closed, at length open, and containing lenticular, corneous bodies which enclose the sporules.—P. 459.

499. Erysiphe. Sporangium epiphyllous; very minute, globose, furnished with white, radiating, subjacent filaments, and containing sporuliferous bodies.—P. 459.

Div. VI. Sporangium solid, carnose or corneous, unaccompanied by filaments. Sporules distributed throughout the mass, or not perceptible.

500. Sclerotium. Sporangium (?) subglobose or without regular form, within homogeneous, vesiculose, carnose or corneous. Sporules unknown.—P. 461.

501. Tubercularia. Sporangium subglobose, sessile or somewhat stipitate, carnoso-vesiculose, (not gelatinous). Sporidia towards the circumference. (Colour mostly red.)—P. 463.

XIV. BYSSOIDEÆ.

Char.—Plants filamentous, for the most part tufted, minute, delicate and fugacious; either subopake, coloured and continuous, or pellucid, tubular, mostly colourless, and jointed. Sporidia in some genera unknown, but when present, produced externally, dispersed among the filaments, or attached to particular parts of them.
Div. I. Filaments minute, pellucid, jointed. Sporidia free, lying in the centre of the thallus or scattered.


503. Sporotrichum. Thallus minute, tufted or expanded. Sporidia scattered among the branched, tubular, jointed filaments.—P. 464.

504. Trichoderma. Sporidia collected in the centre, free; the filaments woven into a web-like covering, at length opening at the apex, and discharging the globose sporidia.—P. 465.


506. Sepedonium. Thallus formed of entangled filaments spreading within putrefying fungi. Sporidia scattered, globose. (Bright yellow.)—P. 466.

Div. II. Filaments minute, mostly pellucid, jointed. Sporules attached to the filaments.

507. Isaria. Filaments minute and pellucid, attached to an elongated, simple or branched, clavate, carnose receptacle.—P. 466.

508. Ceratium. Filaments very short, pellucid, simple, minute, attached to a membranaceous, plicate, simple or branched, filiform receptacle.—P. 466.

509. Stachylidium. Thallus composed of tufted, pellucid filaments; sterile ones procumbent, simple; fertile ones erect, whorled with ramuli near the top, among which the sporidia are collected.—P. 466.

510. Penicillium. Thallus composed of tufted, pellucid filaments; sterile ones procumbent; fertile ones erect, bearing a terminal, pencil-like tuft of erect ramuli, to which the sporidia are attached.—P. 467.

511. Aspergillus. Thallus composed of minute, pellucid, scattered or tufted filaments; apex of the main filament mostly clavate, on which is a head of (often beaded) sporidia.—P. 467.

512. Botrytis. Thallus composed of pellucid, erect, filaments, with mostly spreading branches. Sporidia pedicellate, disposed in a corymbose or racemose manner towards the summits of the branches.—P. 468.

ARRANGEMENT OF THE GENERA.  lxxxi

514. Cladosporium. Thallus composed of erect, rigid, sub-opake, jointed, simple or branched, aggregate filaments. Sporules ovate, attached in a series to the filaments, deciduous.—P. 469.

Div. III. Filaments beaded.

515. Acrosporum. Thallus composed of minute, tufted, pel- lucid, moniliform, simple filaments, the uppermost joints (sporidia?) separating spontaneously.—P. 469.

Div. IV. Sporidia obscure or wanting. Filaments mostly jointless.

516. Torula. Thallus composed of branched, rigid, fragile, moniliform, subopake filaments; the articulations minute, globose.—P. 469.

517. Raccodium. Thallus composed of branched, decumbent, interwoven, jointless, persistent, subopake filaments; among which are sometimes granules of moniliform fila-
ments.—P. 470.

518. Ozonium. Thallus composed of decumbent, branched, entangled filaments; primary ones thick, irregular; ultimate ones fine, jointed.—P. 470.

519. Himantia. Thallus composed of creeping, slender, uniform filaments, often fasciculated, but diverging in a plumose manner towards the apex.—P. 470.

XV. EPPHYTAE.

Char.—Very simple plants, composed merely of aggre-
gated, naked sporidia, or of sporidia mingled with a minute, pulverulent mass.

* Plants naked, on the surface of living leaves.

520. Cylindrosporum. Very minute, parasitic on the surface of living leaves. Sporidia pellucid, cylindrical, truncate, free, not divided.—P. 471.

** Plants bursting through the epidermis of vegetables, (not pulverulent).

521. Fusarium. Minute, subglobose, naked, almost wholly formed of fusiform, free, jointless sporidia.—P. 471.
FLORA EDINENSIS.

Cl. I. MONANDRIA.

ORD. I. MONOGYNIA.

1. SALICORNIA.


HAB. Sea coast. Aberlady Bay, Dr Parsons, in Lightfoot. Inverkeithing Bay, Mr Neill. Morison’s Haven, Dr Graham and Mr D. Steuart. September. ①.

Jointed Glasswort.—Plants destitute of leaves. Stem much branched, jointed, procumbent at the base, then becoming erect; smooth, succulent, 4-10 inches high. Spaces between the joints thickening upwards, and notched at the top. Spikes lateral and terminal, somewhat more than 1 inch long, very shortly jointed. Flowers clustered 3 together, opposite between the notches, inclosed in the fleshy, green perianth, which appears to be pierced by the stamen and stigma. When 2 stamens occur, they appear in succession.

2. HIPPURIS.


HAB. Ditches, pools, and slow streams. Lochend, and east end of Duddingston Loch, Mr Neill. May and June. ⑦.

Mares-tail.—About 12-18 inches high. Stem simple erect. Whorls of about eight leaves. Flowers at the base of the upper whorls, one to each leaf, sessile.

The leaves are sometimes, when immersed in the water, very long, and the whorls crowded; a variety not depending on the season, as Sir J. E. Smith suspects in E. B., as I have observed it in the autumn.
DIANDRIA. MONOGYNIA.  

I. MONOGYNIA.

1. LIGUSTRUM.


**Hab.** Hedges, rare. Private road to the sea side from near Muttonhole, Mr Neill. June July. *†*.

**Privet**—A nearly evergreen somewhat bushy shrub a few feet high. Leaves dark green, opposite, glabrous, entire, with a small point. **Panicles** dense, terminal. **Flowers** white, small, changing to reddish-brown before they fall, odorous. **Corolla** 4-cleft. **Stamens** inserted in the corolla. **Berries** purplish-black.—In mild winters only, evergreen.

2. FRAXINUS.


**Hab.** Woods and hedges, especially in limestone districts. April and May. *†*.

**Common Ash**—A well-known tree. Young trees and the branches of old ones, clothed with a smooth grey bark. Leaves pinnate, with an odd one. Leaflets about 5 pair. Flowers clustered, and appearing before the leaves. **Capsules** flat, 2-seeded. **Fraxinus heterophylla** of authors (E. B. t. 2476.) I conceive with Dr Hooker to be only a variety.

3. CIRCÆA.


**Enchanter's Nightshade**—Plant 1–2 feet high. Leaves opposite, on footstalks, lower ones nearly cordate. **Racemes** long, branched. **Flowers** 2-petalled, white, or pinkish. Germens deflexed, hispid. In var. β, the plant is less than a foot high, the stems are scarcely erect, and the leaves cordate, glabrous, and more shining. I do not conceive there is sufficient specific difference in β, to make it a species: it has been noticed by Dr Graham, that, in the Edinburgh Botanic Garden, the two species pass
into each other, which a minute examination has confirmed. The plant
figured in *Pl. Dan.* (t. 256.) is abundant in the highland woods, and is ex-
actly intermediate in specific character, though often larger than *C. intet-
vana* in every part, and with delicate large leaves. I have also received
this variety from Canada, through the kindness of Dr Holmes of Mon-
tréal. In Eng. Bot. the figures are very inaccurate, and at variance
with the descriptions. I have never seen *C. intermedia* of Ehrihart, but
suspect it is also nothing more than a variety. Another remarkable va-
riety I have seen in the possession of Dr Graham, supposed to come
from North America: the whole plant is more firm and rigid than the
common appearance of *C. intetiana*, the leaves are very small, almost quite
entire, and hisrute.

4. VERONICA.


*Spikes or Racemes terminal (plants perennial).*

1. *V. serpyllifolia*, flowers in a spike; leaves ovate, slightly

*Hab.* Road-sides, pastures, neglected gardens, &c. Not unfrequent

*Thyme-leaved or Smooth Speedwell.*—Stems procumbent, radiating, 3-5 inches
long, rarely suberect. *Leaves* nearly sessile, 3-nerved, varying, as Smith
correctly observes, from smooth to downy, as the plant grows in moist or
dry places. *Spike* rather long, furnished with bracteeae. *Flowers* small,
pale blue.

**Spikes or Racemes axillary (plants perennial).*

2. *V. scutellata*, racemes alternate, pedicels divaricate; leaves

*Hab.* In marshes and bogs. Duddingston Loch, Maughan. Braid Hill
marshes, Dr Graham. Marshes near North Queensferry, Mr Neill.

*Marsh Speedwell.*—Stems 6-12 inches long, erect, weak. *Leaves* toothed or
nearly entire. *Racemes* mostly simple, but sometimes compound, with
the divisions divaricate, like the pedicels of the flowers. *Pedicels* after
flowering, deflexed. *Flowers* flesh-colour, streaked with blue lines.

3. *V. Anagallis*, racemes opposite; leaves lanceolate, serrate;

*Hab.* Ditches and moist places. South side of Duddingston Loch, Brown.
King's Park, and ditches at Muttonhole, Maughan. Ditch by the
farm-house of Blackford, Mr Neill. Burntisland, Mr Arnott. June
—August. *ål.*

*Water Speedwell.*—Stem erect, not weak as in *V. scutellata*, 1-2 feet high,
with a creeping root. *Leaves* lanceolate, sometimes acuminate, rarely con-
nate. *Racemes* long, many-flowered. *Pedicels* shorter than in the pre-
ceding, and never deflexed. *Flowers* blue.

4. *V. Beccabunga*, racemes opposite; leaves elliptical, ob-

*Hab.* Ditches and streams, extremely common. June—August. *ål.*
DIANDRIA. MONOGYNIA. VERONICA.

Brooklime.—Stems 1 foot long or more, decumbent, radicating, branched, round, succulent. Leaves, as well as the whole plant, smooth and shining. Racemes longer than the leaves, many-flowered. Flowers bright blue. It is often found along with water-cresses.


Common Speedwell.—Stems 3–9 inches long, procumbent, radiating, firm, very pubescent. Leaves broadly ovate, serrate, roughly pubescent, on very short petiols. Spikes pedunculate, erect. Flowers pale blue, streaked with darker lines.


Hab. Woods. Rather rare. Arniston and Lugton woods about Rosslyn, Maughan. Newbattle woods, abundant, Dr Graham. Mavisbank, Mr D. Steuart. By the river side, about 1½ miles above Lasswade.

Mountain Speedwell.—Stems 5–12 inches long, ascending, weak. Leaves large, hairy. Racemes lax and few-flowered. Flowers very pale blue, veined. Capsules large, "of two orbicular lobes."


Hab. Woods, hedgebanks, pastures, very abundant. May, June. 7.

German Speedwell.—Stem procumbent or somewhat ascending, a foot long, with a hairy line on each side. Leaves large, sessile, spreading, hairy and wrinkled. Racemes many-flowered, elongated. Flowers large, of a bright beautiful blue, rarely purple, lilac or whithish. Capsule shorter than the calyx.

*** Flowers axillary, solitary, (plants annual).


Hab. Fields, waste places, neglected gardens. Extremely common. April to September. 7.

Procumbent Speedwell.—Stems 3–9 inches long, round, hairy, mostly unbranched. Leaves either opposite or scattered, somewhat hairy. Flowers on pedicels which are rather longer than the leaves, and recurved when in fruit. Flowers small bright blue or whitish. Segments of the Calyx ovato-lanceolate. Capsule of two roundish turgid lobes.

5. PINGUICULA.

(Nat. Ord. Lentibulariaceae, Hook. Scot. 2. p. 213.)


Hab. Ditches and pools. Guillon Loch, abundant, Dr Parsons in Lightfoot; and recently, Dr Graham. June, July. 76.

Greater-lobed Milfoil.—Root very much branched. Stems submersed, furnished with bladdery vesicles, as well as the root; and bearing small capillary or setaceous multifid leaves, which are minutely bristly at their margin, and intermixed with vesicles. Scape about 6 inches high, 4-8 flowered, with a lanceolate bractea at the base of each peduncle. Flowers bright yellow, large, the palate projecting, and closing the mouth, the spur bent downwards.

DIANDRIA. MONOGYNIA. LEMNA.

HAB. Ditches and pools, rare. Peat pits in the moss at Ravelrig toll, Maughan. Pentland Hills SW. of Currie, Dr Graham. June, July. 3.

Lesser-hooded Milfoil.—The smallest of the three British species, and sufficiently distinguished by its extremely short, blunt and keel-shaped nectary. Stems floating in the water, and supplied like the two other native species with numerous reticulated hollow vesicles or bladder-like bodies, which are also attached to the leaves. Leaves irregularly triplicate, linear, dichotomous, smooth. Flowers pale yellow, few, the upper lip not closing the palate.

7. SALVIA.
(Nat. Ord. Labiate, Hook. Scot. 2. p. 214.)


HAB. Pastures and waste places, rare. Salisbury Craigs, and banks entering Kirkcaldy from Dysart, Lightfoot. Burntisland, and near Pettycur, Maughan. Corstorphin Hill, Mr Neill. The part of Salisbury Craigs where it is most abundant, is on the steep bank formed from the debris of the quarries on the south-west side. June, July. 3.

Wild English Clary.—Plant 1–2 feet in height. Stem strong, 4-angled, branched. Lower leaves on long petiols, ovate, crenato-serrate, strongly veined; upper leaves sessile, deeply serrate. Bracteas entire, heart-shaped acute. Segments of the Calyx mucronate. Corolla purple, small, rident. Upper lip concave-compressed. Lower lip 3-lobed, the middle one the largest.

8. LEMNA.
(Nat. Ord. Araceae, Hook. Scot. 2. p. 191.)


HAB. Ditches and ponds, very rare in flower. Duddingston Loch, Dr Parsons in Lightfoot. At Lochend, abundant. June, July. 3.

Ivy-leaved Duckweed.—Fronds about half an inch in length, or somewhat more, thin, especially at the margin, which is pellucid. Young plants or fronds are produced from marginal and lateral clefts, mostly at right angles with the old plants, and of the same form; these in their turn become prolific, so that a frond, as Dr Hooker observes, "may be seen to be triply pinnate with its offspring." The flower is very minute, and, as in the rest of the genus, arises from a lateral cleft, and consists of a pistil and two stamens, enclosed within a delicate, membranaceous, urceolate, monophyllous perianth, through the opening of which the stigma is barely protruded.


HAB. Ditches and ponds, very rare in flower; otherwise extremely common. Duddingston Loch, Lochend, &c. June, July. 3.

Lesser Duckweed.—The smallest of the genus. Fronds about a line and a half long, plane above, slightly convex beneath, somewhat fleshy; generally much crowded, from its rapid increase by gemmae (the young fronds),
so as often to completely cover the surface of stagnant water. Flower resembling that of the preceding species.


Hab. Ditches and pools, rare; especially so in flower. Lochend and Duddingston Loch, Maughan. June, July. 

*Gibbous Duckweed.*—Fronds seldom covering a large surface, but generally in clusters, sometimes purplish, well marked by being pale and hemispherical beneath, and appearing reticulated, from its pellucid structure.

II. DIGYNIA.

9. ANTHOXANTHUM.


*Sweet-scented vernal Grass.*—Almost the only species of British grass that has two stamens. *Plant* fragrant, chiefly giving the sweet smell to new-made hay; about a foot high. *Culm* sulcate and glabrous. *Leaves* plane, rather short and acuminate, those on the stem very short, with a long, somewhat swelling sheath. *Panicle* erect, rather acute, becoming yellow in age. "*Flowers* lanceolate; *valves* of the *Calyx* unequal, very sharp-pointed, slightly pubescent; *valves* of the *ext. corolla* as long as the smaller valve of the calyx, very obtuse, hairy, brown; one with a straight awn from the back, the other with a twisted awn from near the base; *int. corolla*, very small; *valves* membranaceous, obtuse equal."—*Hook.*

III. TRIANDRIA.

I. MONOGYNIA.

1. VALERIANA.


*Corolla* with 1 stamen.


Hab. Old walls, buildings, and waste places. Old walls at Inverleith, Mr E. Maughan. July, August. 7.

*Red Valerian.*—Whole plant glabrous, 12-18 inches high, erect. *Stems* numerous, round, and slightly branched. *Leaves* opposite, rather glaucous, mostly entire. *Flowers* very numerous, in a *corymb*, dense at first, but becoming more lax before the flowering is past; rose-colour, slender, spurred at the base, and with a single stamen, bearing a large dark anther.

**Corolla* with 3 stamens.

2. *V. officinalis*, leaves all pinnate, leaflets lanceolate, serrate,

HAB. Banks of streams, moist meadows, and waste places. Near St Bern-
ard's Well, and Pigget Whins, Mr Neill. Salisbury Craigs, on the debris facing St Leonard's Hill. June, July. entifier.

Great wild Valerian.—Stem 3-4 feet high, erect, furrowed. Leaves all pinnate, with an odd leaflet. dull green, often tinged with pink, lower ones long; with numerous leaflets; upper ones slightly narrower. Flowers flesh-colour, collected into a broad, dense, branched head, and containing both stamens and pistils, whereby it may, independent of other marks, be distinguished from the much smaller V. dioica.


Heart-leaved Valerian.—Plant as large as the preceding, erect; well marked by the large cordate petiolate leaves, which are also acute, toothed, serrated, and smooth. Flowers deep flesh-colour, collected into a large branched corymb. Seed furrowed.

I have no doubt that this and V. rubra are not entitled to be ranked as indigenous species, but they are now too generally introduced into our floras to exclude them; besides, they are in reality, especially the present species, become pretty common in uncultivated places; in fact, more so than some of our undoubted indigenous rarities.


Small Marsh Valerian.—Stem 6-8 inches high, striated, generally pinkish. Leaves on the stem, opposite, pinnatifid, entire, or slightly serrate according to Smith. Flowers cymose, pale flesh-colour, densely crowded. Those plants furnished with stamens only, are always the smallest and weakest.

2. FEDIA.


1. F. olitoria, "fruit tridentate, ovato-rotundate, inflated, gla-


HAB. Cornfields. Frequent about Edinburgh. May to July. ｍ。

Corn-salad or Lamb's Lettuce.—Stem about 1 foot high, dichotomous, slightly scabrous, spreading. Leaves opposite, more or less obovate, sometimes oblong, somewhat but irregularly toothed; radical ones spatulate. Flowers pale blue, in small dense, terminal heads, with an involucre beneath, of oblong bracteas.

2. F. dentata, "fruit sub-tridentate, obpyriform, glabrous, flowers cymbose, with a single flower between the upper di-

TRIANDRIA. MONOGYNIA.


Narrow-fruited Corn-sallad.—Stem 9-18 inches high, dichotomous, widely spreading, having single flowers in the axils. Leaves oblongo-lanceolate, somewhat obtuse, more or less deeply toothed at the base. Flowers not capitate, but in wide and loose corymb, with the bracteae few, narrow, and not arranged in the form of a regular involucre. Fruit narrow, 5-ribbed, with three terminal teeth, which are sometimes almost foliaceous.

3. IRIS.

(Nat. Ord. Irideæ, Hook. Scot. 2. p. 136.)


Yellow Water-Iris.—Roots large, fleshy, horizontal. Stem erect, 3-4 feet high, round, smooth, firm. Leaves erect, long, somewhat glaucous, striated and acuminate. Flowers 3-6 lemon yellow, streaked with purple lines; the larger segments of the perianth rounded, deflexed; the smaller ones erect, and smaller than the stigmas, which are petal-like, arched and fringed or laciniate. The anthers lie under the stigmas.

4. SCHÖENUS.


Black-headed Bog-rush. Culms about a foot high, firm and rigid, sheathed at the base by the remains of old leaves. Leaves setaceous, rigid, roughish, dark and shining at the base, shorter than the culms. Head of flowers somewhat ovate, formed of several very dark purplish, black, or brown spikelets. Interior involucre, small and membranaceous.


Compressed Bog-rush.—Root creeping, fibrous. Culm 6-8 inches high, glabrous, striated, covered by the sheathing bases of the leaves for about one-third upwards, the rest naked. Leaves mostly radical, linear and plane, rather shorter than the culm. Spike bright chestnut-brown. Spikelets 5-10, distichous. "Glumes all but the lower one fertile, so that this is perhaps as well as S. rufus, rather a scirpus than a schœnus." Hook.

3. rufus, culm naked, roundish; spike distichous, larger than the single involucre; spikelets few-flowered; leaves se-

**Hab.** Bogs and marshes. Dunbar, Mr Mackay. On the coast 2 miles east of South Queensferry, Maughan. Moist downs, Aberlady Bay.

July. *

Brown Bog-rush.—Root creeping. **Culm** 5-7 inches high, glabrous, naked, furnished at the base with a few sheathing setaceous leaves canaliculate above, and much shorter than in the preceding species. **Spikes** dark brown. **Spikelets** 5-6 distichous, 2-4 flowered. **Glumes** obtuse. Some-what resembling the last species, but attention to the above characters will resolve every difficulty.

5. **SCIRPUS.**


* Spikes solitary.

† Culms simple.


Scaly-stalked Club-rush.—Plant in dense tufts, and very firmly rooted. **Stems** 3-6 inches high, simple, slender, glabrous, unequal in height, arising from a sheathing, squamose and tough base, and terminating, in what Dr Hooker considers as rudiments of leaves; namely, the 2 outer glumes, which have a foliaceous apex. **Spikes** small, ovate, terminal, reddish-brown. **Fruit** elliptical, surrounded by about 6 bristles. This most abundant species frequently forms almost the entire turf of moist barren moors.


**Hab.** Bogs, moors, and heaths. Leith Links, Mr Mackay. Hunters’ Bog, Mr Bainbridge. Pentland Hills. July, August. *

Chocolate-headed Club-rush.—Plant tufted, more slender in general than the preceding. **Root** blackish. **Stems** simple, smooth, erect, less numerous than in *Sc. caspitosus*, and not surrounded at the base by such a mass of scales. **Spike** dark brown of 3 or 4 flowers. **Glumes** far more obtuse than in the preceding. **Stigmas** 3. **Fruit** surrounded by a few bristles.


* This and *Sc. acicularis* belong to the genus *Eleocharis* of Mr Brown. Kunth unites it to the *Scirpus* of Mr Brown, with the character “**Spiculae multiflorae. Glumæ undique imbricate, vix nullæ vacue. Semen lenticulare aut triquetrum. Setæ pleurumque sex.” As the subject is not decided, it is better in a local Flora to continue them as original *Scirps*. 
Scirpus.  TRIANDRIA.  MONOGYNIA.  11

\( \beta \) minor, smaller, spikes fewer-flowered, glumes deeper brown.  
E. B. t. 1187.

**Hab.** Ditches, marshes, sides of streams, common.  Lochend and Dudleying Loch.  Braid Hill.  Pentland Hills.  \( \beta \) Pentland Hills, G. Don.  July, August.  \( \gamma \).

**Marsh Club-rush.**—Plant tufted with numerous both fertile and barren stems.  **Stems** 6-15 inches high, very smooth, cylindrical, having closely-embracing simple entire sheaths at the base, the lowest ones reddish, and shorter.  **Spike** almost oblong, brownish, many-flowered.  **Glumes** obtuse, especially the two outer ones, with a scariose margin.  **Fruit** surrounded by 4 or 5 bristles.

The most robust species of this section.


**Hab.** Marshes and the sandy sides of Lakes, rare.  About a mile NW. from Lasswade, Dr Parsons in Lightfoot.  July, August.  \( \gamma \).

**Least Club-rush.**—Plant slender, delicate and tufted.  **Stems** numerous, 2-4 inches high, setaceous obtusely 4 angled, especially when dry, barren stems, bearing a large proportion to the fertile ones; sheath at the base tight, leafless.  **Spikes** small, brown, 4-5 flowered.  **Glumes** keeled, acuminate; the keel green.  " **Fruit** oblong, beautifully impressed with points in lines, tipped with the sphericall base of the style."  **Hook.**

†† **Culms branched.**


**Hab.** Ditches and shallow pools.  Ravenghill-toll moss, Messrs Arnott and Greville.  Braid Hill marshes, G. Don.  Marsh on Dunearn Hill, Mr Neill.  July, August.  \( \gamma \).

**Floating Club-rush.**—Plants long, weak, branching, growing in the water.  **Roots** creeping and producing numerous stems, 6-18 inches long, which take root at the joints, and are clothed with alternate, patent, short, and sheathing leaves, many of which float on the surface of the water.  **Culm** naked for about 2 inches below the small, pale, 2-4 flowered spike.  **Glumes** greenish, with a whitish membranaceous margin, the two lower ones the largest.

**Spikes with two or many spikelets.**

† **Culms rounded.**


* In this genus of Mr Brown, there are no bristles accompanying the fruit.  M. Kunth, however, has united Isolepis with Fimbriatula and Echinolongrium, in Humboldt et Bonpland Nov. Gen.  I have not adopted the opinions of either author, for the reason given in the note to Sc. palustris.
TRIANDRIA.  MONOGYNIA.  ERIOPHORUM.

HAB.  Sides of streams and ponds.  Marsh and old willow grounds, half-
way between Duddingston and Fortobello, Mr Macnab.  Lochend, Mr

Bull-rush.—Roots creeping, strong.  Culms 3-8 feet high, round, attenuated
upwards, very smooth, sheathed at the base, some of the upper sheaths
ending in a linear acute leaf, about 4 inches long.  Involucres very vari-
ous in length, the longest often reaching a little above the panicle, but
often much shorter; beneath the clusters of spikelets are also small in-
volucres, and several inner ones at the base of the peduncles.  Glumes
brown, concave, fringed, carinate.  Fruit surrounded by about 6 bristles.
Plant used in making chair-bottoms, mats, &c.

7. Sc. setaceus, culms setaceous, terminating in a single in-

HAB.  Moist gravelly places, rare.  King's Park, G. Don.  By the re-

Setaceous Club-rush.—Plants tufted.  Culms 2-5 inches high, ascending,
slender, numerous, glabrous, striated.  Spikelets mostly geminate, but some-
times single, or even three, apparently lateral, as the single involucre
seems to be an actual elongation of the culm.  Glumes broad, very short-
ly acute, reddish-brown, with a green margin and keel.  Fruit striated.

++ Culms triangular.

8. Sc. maritimus, culm leafy; spikelets sessile and peduncu-
late, in a terminal cluster; involucres many, foliaceous; glumes

HAB.  Ditches and marshes near the sea.  Stream-side near Luffness,
Dr Graham.  July.  ♀

Salt-marsh Club-rush.—Root creeping.  Culms leafy triangular, 2-3 feet
high, tufted, rough at the angles.  Leaves long, linear, acute, mostly
longer than the culms.  Involucres several, two usually longer than the
terminal cluster.  Spikelets large, ovate, reddish-brown.  Glumes notched
or sub-laciniate at the end, with a long mucronate termination of the
keel.  Fruit accompanied by 2-4 bristles.

Sc. sylvaticus, culm leafy; spikelets in a repeatedly com-
ound cyme, furnished with an involucre of several foliaceous

HAB.  Moist woods and banks of streams.  Near Rosslyn Castle, Dr
Parsons in Lightfoot.  Between Lasswade and Rosslyn, Messrs Arnott
and Greville.  July.  ♀

Wood Club-rush.—Culm 2-3 feet high, very leafy, erect.  Leaves nearly
linear, broad, acuminate, ribbed, scabrous at the margin, and very long.
Involucres, having one of its 3-4 leaflets longer than the cyme.  Cyme
spreading; the divisions various in their direction, and having at the
base of each a lanceolate bractea.  Spikelets small, ovate, somewhat, clus-
tered.  Glumes ovate, greenish.  Stigmas 3.  Fruit roundish, surrounded
by 6-8 bristles.

6. ERIOPHORUM.

* Spike solitary.

1. E. vaginatum, culm triangular above, sheathed; the up-


Hares-tail Cotton-grass.—Plant densely tufted. Culm erect, shorter than the leaves when in flower, much longer when in fruit, being then 12-18 inches high, sheathed with the bases of the straight, channelled setaceous leaves; the upper sheaths have gradually shorter leaves, and the two last are naked, ventricose, and membranaceous. Spike large, somewhat acuminate. Glumes scariose, membranaceous, dark blueish-grey.

This and all the other species are beautiful objects when in seed, from the abundance of the long silky hairs which spring from the base of the fruit, and makes the whole resemble a tuft of the finest white silk or cotton.

** Spikes many, pedunculated.


Common Cotton-grass.—Plant tufted. Culm 12-18 inches high, rounded below, subtriangular above, smooth. Leaves a little shorter than the culm, channelled, smooth, narrow and sheathing the stem at their base. Involucre 2-3-leaved unequal, plane, linear, acuminate. Spikes 3-5, ovate on simple peduncles of different lengths. Glumes lanceolate, brown, with a pale scariose margin. Silky hair of the fruit most abundant in this species, which renders it eminently conspicuous during the summer.


Broad-leaved Cotton-grass.—Tufted. Culm 1-2 feet high, trigonous, smooth, leafy. Leaves much shorter than the culm, plane, broadly linear, acute. Involucre 2-4-leaved; acute, dilated at their base. Spikes on simple or branched peduncles, ovate, 5-8, drooping when in fruit with the lengthened peduncles. Glumes lanceolate, scariose, greenish-brown. Silky hairs of the fruit more compact, and much shorter than in the preceding.

7. NARDUS.

(Nat. Ord. Gramineae, Hook. Scot. 2. p. 163.)


Mat-grass.—Plant much tufted, and stiff and rugged at the base with the remains of old stems and leaves. Culms numerous, 3-9 inches high, wiry, smooth. Leaves setaceous, rigid, very numerous. Spike terminal, erect, with the florets placed alternately in two rows, all pointing in one direction. Valves of the calyx unequal, the outer one purplish, awned. Style undivided.
II. DIGYNIA.

8. ALOPECURUS.
(Nat. Ord. Gramineæ, Hook. Scot. 2. p. 163.)


Hab. Meadows and pastures, very common. May to July. [7]

Meadow Foxtail-grass.—Culm 1–3 feet high, erect, leafy. Leaves nearly smooth, somewhat pubescent, linear. Stipules very short. Spike 1 to 2 inches long, dense, many-flowered, silky with the down of the glumes, yellowish-green. Glumes all nearly equal, and ciliated. Anthers remarkably conspicuous. One of the most early and useful agricultural grasses.


Hab. Ditches, wet meadows, and marshes, very common. King's Park by the ditch facing Sampson's Rib. June, July. [7]

Floating Foxtail-grass.—Culms 12–18 inches long, floating or prostrate on the wet soil, radicating at the joints, and ascending towards the ends, branch-
ed, smooth. Leaves short, rather broad, nearly smooth, the uppermost one with a tumid sheath. Stipules white and delicate, oblanceolate. Spike about one inch and a quarter long, often purplish. Glumes of the corolla as obtuse as those of the calyx, varying in the length of the awn. An-
thers yellow, and, if Dr Hooker is correct in thinking A. fulvescens (E. B. t. 1467.) the same species, they are also brown. Host and Gaudin de-
scribe them as such in A. geniculatus.

9. PHALARIS.
(Nat. Ord. Gramineæ, Hook. Scot. 2. p. 163.)


Hab. Waste places. Certainly not indigenous, but sometimes met with about Edinburgh; of course in no fixed station. June, July. [7]

Manned Canary-grass.—Culms 1–2 feet high, leafy, with brown joints. Leaves broad, lanceolate, soft, slightly pubescent, with a long sheathing, inflated base, and obtuse stipule. Glumes of the calyx streaked with green lines, and furnished with a remarkably deep and acute keel, which in-
creases towards the apex, when it becomes rather suddenly acuminate. Ex
t. valves of the corolla much smaller and more acute than the inner ones. Seed ovate, shining, yellowish; well known as the food of canary birds in this country.

Phalaris.  TRIANDRIA.  DIGYNIA.  


Reed Canary-grass.—Culms 3–5 feet in height, strong, erect, smooth, leafy, joints several. Leaves spreading, broad, lanceolate, acuminate, smooth, with a long sheathing base and very short stipule. Spiked panicle 6–8 inches long, branches rough, the florets in second clusters, mostly tinged with pink or purple. Calyceine glumes lanceolate. Int. glumes nearly as long as the calyx, unequal and lanceolate.

10. PHLEUM.


Hab. Meadows and pastures, common. June, July. 7.

Common Cat’s-tail-grass.—Culms 1–3 feet high, erect, leafy, a large portion, however, naked above the uppermost leaf. Leaves roughish, plane, linear-lanceolate, with very long cylindrical sheathes. Stipules short, obtuse. Spikes very long, 2–5 inches, cylindrical, dense, with very many flowers, often purplish. Calyceine glumes pale, membranaceous, with a firm green keel or dorsal nerve, ciliated at the back, and passing into a short, slightly spreading awn. Glumes of the corolla very small, unequal, obtuse, ribbed with green. This plant is liable to vary in size from situation. The root also, owing to this cause, is sometimes bulbous, when it becomes the Ph. nodosum of Linn. 7.


Sea-side Cat’s-tail-grass.—Culms 3–6 inches high, nearly erect, 3–5 from a single root, leafy. Leaves lanceolate, slightly glaucous, rough at the edges, inclosing the culm with somewhat inflated and long sheaths. Spike half to one inch long, rigid, green, many-flowered. Glumes of the corolla very short and broad, obtuse, crenate, membranaceous, and ornamented with green stripe.

11. MILIUM.


Spreading Millet-grass.—Culms slender, 3–4 feet high, erect, smooth, leafy. Leaves broad, plane, with a roughish margin. Panicle very elegant, diffuse, lax, branches capillary, several springing from the same point. Calyx glumes equal, elliptical, concave, green, nearly smooth. Glumes of the corolla cartilaginous, very concave, persistent, and embracing the seed. The panicle of this beautiful grass is often a foot long and eight inches wide.
TRIANDRIA. DIGYNA. AGROSTIS.

12. AGROSTIS.

* Outer valve of the corolla awned.

1. Ag. Spica-venti, calycine glumes unequal, lanceolate, rough at the back; valves of the corolla subequal; the outer one with a long straight awn inserted below the summit. Smith, Fl. Brit. p. 77. E. B. t. 951.

Hab. Moist sandy places. Rosslyn woods, Mr Bainbridge. June, July. 4.

Silky Bent-grass.—Culms 2–3 feet high, slender, somewhat geniculate at the base, glabrous. Leaves rather broad, slightly pubescent above, rough and ribbed beneath. Stipules rather long. Panicle 3–12 inches in length. spreading, much branched; branches filiform scabrous. Flowers very numerous, green or tinged with purple, well marked by the external valve of the corolla, being furnished with a very long, straight awn, inserted a little below the apex, and which gives a silvery appearance to the panicle.

2. Ag. canina, calycine valves somewhat unequal, lanceolate, rough at the back; valves of the corolla very unequal, the one very minute, the other with a dorsal awn from below the middle. Lightf. p. 93. Smith, Fl. Brit. p. 78. Hook. Fl. Scot. p. 24. E. B. t. 1856.

Hab. Pastures, heathy places, very common. Abundant in the King’s Park. June, July. 4.

Brown Bent-grass.—Culms tufted, 1 to near 3 feet high, slender, “creeping and prostrate, except the flowering part, which grows ascending or erect.” Leaves linear, narrow, rough on both sides. Panicle erect, lax, slender, the branches long, erecto-patent. Calycine glumes ovato-lanceolate, a little unequal, divaricate, purplish. Larger valve of the corolla striated with 4 nerves.

The flowers are commonly purple, but they vary, though rarely, to straw-colour and pale green. The awn is also apt to vary in length, sometimes not reaching to the apex of the valve, at others equal to it in length. Dr Hooker describes a minute tuft of hairs, as occupying the place of the second valve of the corolla; in all my specimens, however, there is a true lanceolate valve, though minute.

** Corolla awnless (rarely otherwise).


β. Outer valve of the corolla awned, (Ag. canina, With.).

γ. Very dwarf; 3–5 inches high, (Ag. pumila, Lightf.)


Fine Bent-grass.—Root creeping. Culm erect, 1–2 feet high, glabrous. Leaves shortish, linear acuminate, roughish. Panicle erect, with patent branches. Rachis smooth, branches and branchlets rough, sometimes
nearly smooth, and variously divided. Flowers purplish. Calyx-glumes with a white scarose margin, ovato-lanceolate, smooth, rough at the back. Corolla of two unequal membranaceous greenish-white valves, the inner one 2-nerved, with a bicorn apex. Anthers as long as the corolla. The branches of the panicle are arranged in a subverticillate manner; a single branch commonly stands out on one side, while the rest are in a sort of fascicle on the other; this arrangement, however, is alternate to the top of the panicle.


Marsh Bent-grass.—Plant stouter than the last, and generally larger. Culms ascending, often rooting at the base, and throwing out runners. Panicle rather contracted, pale green or purplish, branchlets patent. Calyx-glumes as in Ag. vulgaris, as are those of the corolla, but the outer valves have 5 nerves, and as many teeth, and the inner one is only faintly 2 or 3 nerved at the base, nearly entire and obtuse at the extremity. In some individuals, but I know not if they are found in Scotland, there is a short awn at the base of the outer valve of the corolla.

The character of this species, and the whole of the description, I have given in Dr Hooker's own words. Vid. Fl. Scot. That eminent botanist has bestowed much labour on it, and has been enabled to compare a greater number of authentic specimens together, than I could do, were I disposed to dissent from him. It would repay any one the trouble of accurately investigating Ag. vulgaris, alba, and stolonifera.

13. ARUNDO.


Sea-side Reed.—Root creeping, very long, jointed. Culms 2–3 feet high, erect, very rigid, cylindrical, smooth. Leaves slightly spreading, very long, involute, rigid, glaucous, with a very sharp point. Flowers in a compact spike swelling in the middle, 3–4 inches long, pale greenish. Calycine glumes lanceolate, with a rough keel; those of the corolla shorter and more rigid. Downy hairs at the base very short. Anthers purple.—Very useful in binding the loose sand on the sea-shore.


Common Reed.—Root creeping. Culms erect, 5–7 feet high, strong, very leafy, with numerous joints. Leaves broad, lanceolate, acuminate, spreading, rough at the margin, very smooth and somewhat glaucous beneath,
TRIANDRIA. DIGYinia. Holcus.

Sheaths very long. Panicle sub-erect, lax; the branches long, capillary. Calycine glumes very unequal, acute, and smooth, the longer one 3-nerved. Florets surrounded by a tuft of silky hairs as long as the glumes.—Plant used for thatching and fences; also by artists for making reed-pens for sketching.


Hab. Hedges, pastures, and waste places, very common. July. *

Oat-like Soft-grass.—Root composed of 2-5 knots, placed one above the other, the smaller ones being uppermost. Culms erect, about 3 feet high, simple, glabrous. Leaves dull green, plane, spreading, rough on the upper surface. Panicle long, lax, tapering upwards; branches rather short, semi-verticillate, rough, becoming patent when in flower. Calycine glumes unequal, lanceolate, acute, shorter than the corolla, greenish-brown, as well as the glumes of the corolla, the outer one of which is nervèd, striated and ciliate at the back.—Plant with the habit of an Avena.


Hab. Fields, hedges, waste places, rare. The Meadows, Mr Neill. My specimens were gathered on the waste ground near Canonmills Loch. July. *

Creeping Soft-grass.—Roots creeping, long. Culms 1-2 feet high, ascending. Leaves linear-lanceolate, acute, having long inflated sheaths; rather smooth, indeed the whole plant is but slightly pubescent compared with the following species. Panicle erect, broad for its length; branches spreading. Spikelets ovate, very pale, tinged with dull purple. Calycine glumes ovato-lanceolate, compressed, much longer than the corolla, and inclosing them. "Both florets often destitute of pistil," Hook. Principally distinguished from the following by the protruded awn and creeping roots.


Hab. Meadows and pastures, very common. June, July. *

Meadow Soft-grass.—Root not creeping. Culms numerous, erect, villose, 1-2 feet high. Leaves plane, linear-lanceolate, villose on both sides. Panicle erect, about 3 inches long, lax, soft, pale, purplish; branches frequently divided, capillary, erect before flowering; afterwards patent. Flowers much the same as in the preceding species, with the exception of the curved and unprotruded awn.

15. AIRA.

* Corolla awnless.

1. A. cristata, panicle spiked; florets longer than the calyx;


Water Hair-grass.—Root creeping. *Culms,* if growing in water, partly floating, if not, prostrate towards the base, rooting at the joints, the rest ascending, 1–3 feet long, branched, very leafy, smooth. *Leaves* linear, plane, obtuse, often floating, deep green. *Panicle* large, erect, smooth, branches patent, beginning to flower before the lower part is quite emerged from the sheath of the uppermost leaf. *Spikelets* oblong, rich reddish-brown. *Calyx-glumes* small, unequal, very broad, obtuse, 2–3 nerved. *Florets* much longer than the calyx, "upper ones pedunculated, their *valves* concave, brown, with green ribs, diaphanous at the point;" *Hook.*—Mr. Neill has seen this grass in Restalrig meadow with decumbent culms of above 2 yards in length.

**Corolla awned.**


Turfy Hair-grass.—Plant forming great tufts, 2–3 feet in circumference. *Culms* 2–4 feet high, sub-erect, leafy, with a long noded space above the last leaf. *Leaves* long, linear, narrow, plane, somewhat rigid, smooth beneath, rough at the margin, acuminate. *Panicle* very large, lax, diffuse, elegant, erect-inclined, shining silvery brown-grey, sometimes very pale, much branched. *Spikelets* small, very numerous. *Calyx-glumes* subequal, but varying, ovato-lanceolate, roughish at the back. *Upper floret pedunculate.* *Valves* of the *florets* ovate, very obtuse.—A large very graceful grass. It is viviparous sometimes on the banks of rivers, as by the river-side at Pitcaithly, where abundance was discovered in that state by Mr. Neill in July 1822.

4. *A. flexuosa,* "panicle (when flowering) diffuse; florets villous at the base, as long as the calyx; awn jointed, inserted near the base, much longer than the corolla; leaves setaceous."
TRIANDRIA. DIGYNA. MELICA.


Waved Hair-grass.—Culms erect, 12-18 inches high, naked except at the base, smooth, mostly purplish, with one joint or knot near the base. Leaves short, setaceous, rough at the margin, mostly radical. Panicle lax, rather few-flowered, with forked, flexuose, rough, capillary branches. Spikelets shining, purplish or pinkish brown. Calycine glumes rather unequal, ovato-lanceolate. Values of the corolla as long as the shorter glume of the calyx. Far more diffuse in the panicle when flowering than before.—Often covering moorish pasture to a great extent.


Hab. Gravelly hills and waste places. Debris on the south-west side of Salisbury Craigs, Mr Neill. June, July. *H.*

Silver Hair-grass.—Culms slender, erect, 3-8 inches high, smooth, leafy. Leaves few, short, linear, the radical ones quickly withering. Panicle trichotomous, with capillary, smooth, divaricate branches. Spikelets not very numerous, silvery, and often purplish grey, small, ovate. Calycine glumes lanceolate, equal, rough at the back, white and scariose at the apex. Values of the corolla whitish, scariose, slightly unequal, half the length of the awn.


Hab. Sandy hills, pastures, wall tops. South-west side of Salisbury Craigs, towards the bottom of the debris. May, June. *H.*

Early Hair-grass.—Culms 2-5 from the same root, erect, about 3 inches high, leafy, smooth. Leaves short, smooth, the radical ones soon fading; the cauline ones furnished with long, angular, tumid sheaths. Panicle somewhat compact, half to one inch long, silvery and greenish. Spikelets not numerous. Calycine glumes lanceolate, roughish at the back. Values of the corolla narrower, acute, with a bifid apex, the awn about half as long again as the valves.

16. MELICA.


Hab. Woods, rare. Rosslyn woods by the path-side, plentiful. May, June. *H.*

Nodding or Mountain Melica-grass.—Culms 12-20 inches high, scarcely erect, slender, simple, leafy. Leaves plane, linear, acute, the lower cauline ones much shorter than the upper ones, with a rough margin. Panicle about 3 inches long, the spikelets second on short drooping peduncles. Calycine glumes nearly equal, ovate, very concave, deep purple-brown;
those of the corolla very unequal, rigid, nerved. There is besides the two perfect florets, an imperfect one which is very minute.


Wood Melic-grass.—Culms erect, 12-20 inches high, slender, leafy. Leaves linear, plane, acuminate, broader than in the preceding species. Panicle slightly drooping, the branches somewhat secund, filiform, few, the two lowermost arising together. Spikelets ovate, purple-brown, erect. Calyceine glumes unequal, ovate, rather obtuse, containing a single perfect floret, and the rudiments of at least one more.


Purple Melic-grass.—Plant much tufted. Culms 6-18 inches high, numerous, ascending or erect, rigid, glabrous, having a single joint at the base. Leaves nearly erect, long, linear, acuminate, roughish. Panicle 2-5 inches long, branched, not spreading, purple. Calyceine glumes nearly equal, lanceolate, keeled. Florets much longer than the calyx, 2 generally perfect, 1 imperfect. Anthers and stigmas deep purple.—In shaded places, it varies with a pale panicle, according to Lightfoot's herbarium, as quoted by Smith. This, I suppose, is Mr D. Don's M. alpina.

17. POA.

* Spikelets linear (in P. aquatica and compressa linear-ovate.)


Hab. Banks of streams, ditches, wet meadows. At Bonnington Bridge, on the banks of the Water of Leith, Maughan. By the same stream, about a quarter of a mile below Canonmills Bridge. July, August. ☞.

Reed Meadow-grass.—Roots creeping. Culms erect, 3-6 feet high, smooth, leafy, fibrous roots issuing from the lowest joints in a whorled manner. Leaves very long, sword-shaped, erect, very broad, rough at the margin and keel. Panicle very large, 6-12 inches long, rather lax, the branches rough. Calyx-valves much smaller than the corolla, ovate, obtuse, with whitish scariose margins, and containing about 6 florets. Inner valves of the corolla narrowest, bifid.


Floating Meadow-grass.—Root long, creeping. Culms rooting at the base, and partly prostrate, the upper part ascending, 1-3 feet long, smooth, succulent, somewhat flaccid. Leaves plane, linear-lanceolate, acute, the lower ones floating, all with long smooth sheaths. Panicle slightly curved, slender, branched, 6-12 inches long; branches mostly erect, but the lower ones more or less spreading. Spikelets alternate, on short peduncles, completely linear, many-flowered. Calycine valves unequal, small, ovate, and obtuse. Valves of the corolla ovato-oblong, the outer roughish, 7-ribbed, with shorter intermediate ones at the base; the inner ones notched. The Manna seed of the shops is the seed of this plant.


Hab. Banks on the sea-shore. Sea-side at Caroline Park; and forming nearly the whole pasture in the salt marshes at Aberlady Bay, Mr Neill. About Kirkcaldy, at the west end near the bridge. July. Q.

Creeping Sea Meadow-grass.—Plant tufted, rather rigid, glaucous. Culms numerous, about a foot long, ascending, smooth, leafy. Leaves involute, acute, rather pungent, furnished with long sheaths. Panicle about 3 or 4 inches long, purplish and glaucous, with the rough branches more or less spreading when in flower, but at all other times erect and coarctate. Spikelets linear-acute, about 5-flowered, with 5 obtuse ribs. Calycine glumes unequal, lanceolate, acute, keeled, nearly as long as those of the florets.


Hab. Banks, walls, and stony places, generally near the sea. Salisbury Craigs, and rocks in the King's Park, Lightfoot. Road-side from Edinburgh to Haddington near Drummore, and on walls, Burntisland, plentiful, Maughan. Blackford Hill, Mr Neill. Coast of Fife, Mr Arnott. June. ".

Hard Meadow-grass.—Whole plant rigid and wiry. Culms 1-6 from the same root, 2-6 inches long, ascending, smooth, reddish or greenish, shining, with 2 or 3 caudine leaves. Leaves short, acute, sometimes involute, smooth below, rough above, mostly arising from the base. Panicle remarkably stiff, bearing the spikelets in a direction between distichous and secund. Spikelets linear, sessile, or on short peduncles, 4-8 flowered. Calycine valves slightly unequal, lanceolate, keeled; those of the florets rather obtuse, oblong, smooth, ribless, without a keel, and somewhat distant.


Hab. Walls, waste places, pastures. Walls about the King's Park, Maughan. Common about Edinburgh, Mr Arnott. On the walls at St Léonard's, and among the debris of Salisbury Craigs. July, August. ".

Creeping Meadow-grass.—Culms ascending, and geniculate at the very base, the rest quite erect, leafy below, above naked, striated, very compressed.
Leaves smooth, plane, linear, acute, slightly glaucous in some situations; sheaths long, rather tumid. Panicle varying much in size, according to situation, from 1-4 inches long, and from being very compact to much branched; while flowering the branches are spreading. Calyx-valves ovato-acute, ribbed, containing, as the plant grows on dry walls or elsewhere, from 3 to 11 florets; outer valve of the corolla scarcely nerved; those of the lower florets connected by a delicate webbed substance.

**Spikelets exactly ovate.**


Hab. Meadows and pastures, common. June, July. 7.

**Roughish Meadow-grass.**—Culms 1-2 feet high, rather decumbent at the base, the rest erect, simple, leafy, sometimes purplish. Leaves spreading, flaccid, roughish beneath, and at the margin sheathed. Ligule oblong, acute. Panicle rather large, erect, much branched, diffuse; the branches rough, patent. Calyceal glumes rough at the back, equal, containing about 3 flowers. Glumes of the corolla connected by a web.


β. minor, much smaller, subglaucous, panicle fewer-flowered.


**Smooth-stalked Meadow-grass.**—Root stoloniferous, creeping. Culms numerous, 1-2 feet high, simple, smooth, leafy. Leaves spreading, somewhat obtuse, occasionally glaucous, sheathing. Ligule very short, obtuse. Panicle rather large, much branched; the branches patent, less rough than the preceding. Spikelets about 4-flowered, greenish or purplish. Calyceval valvules somewhat unequal, acute, 3-nerved; those of the florets scarious at the margin and apex; the outer ones 5-nerved, all connected at the base by a long villous web.


Hab. Meadows, pastures, road-sides, &c.; the most common British grass. Spring to Autumn. ⊙.

**Annual Meadow-grass.**—Culms numerous, ascending, smooth, branching at the base, and rooting at the joints. Leaves linear-bluntish, plane, sometimes waved, bright green, sheathing; ligule oblong acute. Panicle erect, pale green, with smooth, spreading, nearly simple branches. Calyceal valvules unequal, ovato-lanceolate, nerved, containing about 5 florets. Keel and base of the external valvules of the corolla hairy.

9. **P. nemoralis**, panicle slender, somewhat drooping, very lax; spikelets of about 3 subdistant florets; culms and sheaths

**Hab.** Woods and thickets, frequent. Rosslyn woods. June and July. 

**Wood Meadow-grass.**—Root slightly creeping. Culms 1–3 feet high, erect, very slender, glabrous. Leaves principally cauline, narrow, acuminate. Panicle varying in size, very weak, with the branches rough; capillary, erecto-patent or somewhat drooping. Spikelets not very numerous, pale green. Calyx-valves unequal, ovato-lanceolate, rough at the back, obscurely ribbed. *External valve of the corolla lanceolate, hairy at the base, keeled.*

Dr Hooker thinks that *P. glauca*, E. B. t. 1720, and *P. casia*, E. B. t. 1719, are only varieties of this species. Of the former there can, I think, be no sort of doubt; but the latter is not so clearly a variety.


**Decumbent Meadow-grass.**—Culms numerous, ascending, 6–12 inches long, somewhat rigid, smooth. Leaves linear, straight, hairy, rough at the back towards the apex. Ligule a small tuft of hairs. Panicle generally simple, 5–12 flowered, rachis and peduncles rough. Spikelets ovate, acute, often tinged with a dull blueish-purple. Calycine glumes lanceolate, equal, with a roughish keel. " *External valve of the corolla ovate, nerved or ribbed, having a small tuft of hairs on each side the base; apex with 3 teeth: interior valve obtuse, entire at the point, ciliated at the angles of the fold;*" *Hook.*

18. **BRIZA.**


**Hab.** Meadows and pastures. June. 

**Common Quaking-grass.**—Culms about 1 foot high, slender, erect, very smooth. Leaves linear-acuminate, short, plane, roughish. Panicle much branched, erect; branches somewhat flexuose, divaricate, very slender, purple. Spikelets tremulous, shining, purple, edges of the florets green. Calycine valves very concave and obtuse. *Inner valves of the corolla minute.*

19. **DACTYLIS.**


**Hab.** Meadows, hedges, waste places, very common. July, August.  

**Rough Cock's Foot-grass.**—Plant tufted. Culms erect, 1–3 feet high, firm, rough. Leaves spreading, linear, acute, plane, deep green, rough. Pa-
Dactylis. TRIANDRIA. DIGYNA.

nicet branched alternately; the branches very rough, the lowest most patent and the longest. Spikelets crowded, clustered on each branch, 3-4-flowered. Calycine glumes unequal, keeled. External glume of the corolla lanceolate, much compressed, scabrous, dilated at the keel, and shortly awned. Internal glume bifid.—A very coarse grass.

20. Cynosurus.


Crested Dog's-tail-grass.—Culms tufted, numerous, erect, about a foot high, smooth, naked above. Leaves smooth, linear acute. Spike about an inch and a half long, the rachis regularly flexuose. Spikelets subsessile, 3-5-flowered. Calycine valves acutely lancelate, with a rough keel, as long as the florets. External valve of the corolla green, with a scabrous keel, terminated by a rough, short awn; the internal one white, bifid.

21. Festuca.


Sheep's Fescue-grass.—"Leaves short, often curved, smooth or slightly scabrous, much tufted, and affording excellent feed for sheep. Ligne very short, projecting on each side. Culms 4–8 inches high, in the upper part more or less square. Calycine valves much shorter than the corolla, acute, subglabrous. Outer valve of the corolla more or less glabrous, sometimes pubescent upward, or even hairy, terminated by an awn, which, though varying in size, at the utmost does not exceed half the length of the valve. Whole plant more or less glaucous, with a purple tint in the spikelets." Hook.


Hab. Pastures and waste grounds, very common. β. Shores and islands of the Frith of Forth, plentiful, D. Don.

Hard Fescue-grass.—This species, Dr Hooker observes, "is generally twice or thrice the size of the preceding; the spikelets large, but varying as well as the pedicels in roughness and pubescence, often smooth. The lower leaves are complicate, the upper ones more or less plane. The colour of the plant is generally glaucous green, the spikelets more or less tinged
with red." The plant is 1-2 feet high. The characters of the above two difficult species are taken from Dr Hooker, as well as the descriptions.


**Hab.** Walls and dry pastures, rare. Wall-top north of Ravelston, plentifully, Mr Neill. Frequent on walls about Edinburgh, Dr Yule. On the wall by the road side about half a mile west of Slateford. June. 2.

Barren Festuca-grass.—Culms numerous, 3-12 inches high, erect, smooth, leafy towards the base. Leaves linear, setaceous, angular, acute, shorter than their sheaths. **Panicle** 1-3 inches long, sometimes a little branched at the base. **Spikelets** few, secund, but not drooping. **Calycine glumes** unequal, lanceolate, acute, with a rough keel, containing about 6 florets. **External valve** of the corolla linear-lanceolate, terminating in an awn twice its own length.

—Plant with the habit of a Bromus.


**Hab.** Walls and barren places. Near N. Queensferry, on the hill by the road leading to Inverkeithing, Mr Neill. June. 2.

Wall Festuca-grass.—Very similar to the preceding, but taller, and the panicle much longer, and more drooping. Culms numerous, 12-16 inches high, slender. Leaves somewhat broader than the last, and often clothing the whole culm to the very base of the panicle. **Panicle** 3-6 inches long, narrow, lax, branched. The awns of the florets longer.


**Hab.** Shady woods. Rosslyn woods, Mr Bainbridge. July, August. 2.

Tall Festuca-grass.—Culm 3-4 feet high, erect, glabrous, leafy. Leaves broad, erect, rough above and at the margin, somewhat shining beneath, sheaths long. **Panicle** loose, branched, branches drooping to one side. **Spikelets** ovate or oblong. **Calycine glumes** very unequal, acute, largest with 3 ribs. **Outer valve** of the corolla obscurely ribbed, terminating in a long awn; the inner one cleft at the apex, and not ciliated as in Bromus.

—Habit that of a Bromus.


**Hab.** Meadows and hedges. At the back of Edinburgh Castle, Mr Neill. Marshy meadow at the foot of Salisbury Craigs, Dr Yule. Hope Park, Mr Greene. It grows on each side of the walk, on the south side, upper division or west end. June, July. 2.

Spikeless Festuca-grass.—Culms unbranched, erect, 1-2 feet high, glabrous and leafy. Leaves smooth, linear, acute, not long. **Spike** 3-8 inches long; **rachis** flexuose. **Spikelets** about 6-flowered. **Calycine glumes** unequal.
BROMUS. TRIANDRIA. DIGNYIA.

acute.—Plant very like Lolium perenne, but distinguished from it by having a calyx of 2 valves; and from Poa fluitans by the nerveless and subacute glumes.


Hab. Moist meadows and pastures, common. June, July. 2.

Meadow Fescue-grass.—Culms many, erect, 1-2 feet high, glabrous, leafy. Leaves spreading, linear, acuminate, cauline ones rough on both sides. Panicle somewhat inclined one way, the branches mostly simple, rough, subracemose. Spikelets linear-oblong, compressed, on short pedicels, not very numerous. Calyx glumes unequal, acute, keeled, glabrous. Outer valves of the corolla acute, the inner ones pubescent at the margin. —The branched panicle is alone sufficient to distinguish this from the last.


Hab. Moist meadows. River bank at Rosslyn, Mr Neill. Caroline Park, Mr Arnott. June, July. 2.

Tall Fescue-grass.—Root creeping. Culms 3-4 feet high, erect, firm, glabrous, leafy. Leaves broader and longer than in the preceding species, smooth, the margin roughish. Panicle slightly drooping or suberect, much larger than the preceding, more branched, and with more spikelets. Outer valve of the corolla generally with a very short awn.

22. BROMUS.


* Flowers in a spike.


Spiked Heath Bromegrass.—Culms near 2 feet high, erect, smooth, leafy, simple. Leaves somewhat erect, linear-lanceolate, acuminate, sub-rigid, roughish, and mostly destitute of hairs. Sheaths quite smooth. Spike erect, distichous. Spikelets 6-10 long, linear, erect, 8-12 flowered. Florets closely imbricate. Calyx glumes unequal, ovato-lanceolate, subaristate, nerved. Outer valve of the corolla obovato-acute, with an awn shorter than itself, often scarcely any. Differs at first sight from the following, in the erect spike, longer and more numerous spikelets, the smooth sheaths of the leaves and stem, and in the leaves themselves being less hairy, often quite naked.


**Flowers in a branched panicle.**


_Hab._ Cornfields. Near Rosslyn, Mr Neill. July, August. *

Smooth Rye Bromegrass.—Culm 2–3 feet high, erect, simple, smooth. *Leaves* long, rather hairy, rough at the margin, and beneath ribbed. *Panicle* spreading, slightly branched; the spikelets suberect at first, but drooping when in seed. *Calycine valves* ovate, obtuse. *Outer valve* of the corolla ovate, nerved; the awn arising just below the summit, shorter than the valve, straight, rough.


_Hab._ Cornfields, rare. Fields behind the Botanic Garden, Mr Yalden in Lightfoot. Between Edinburgh and Newhaven, Smith in Fl. Brit. and *E. B.* June, July. *

Downy Rye Bromegrass.—Culm glabrous. *Leaves* towards the base naked underneath, above subpilose at the margin; the upper ones clothed with a downy pubescence on the lower surface, and hairy above, all rough at the margin. *Panicle* large, patent; the branches rough, mostly simple and 1-flowered. *Spikelets* near an inch long, ovato-lanceolate, compressed 12–16 flowered; florets at length sub-remote. All the glumes softly pubescent, rarely smooth.

The description of this species I have taken from Smith, as I have never succeeded in finding it, and do not possess specimens.


_Hab._ Fields, banks, walls, roadsides. June. *

Soft Rye Bromegrass.—Culms erect, 1–2 feet high, smooth or pubescent, the joints swelling and very downy. *Leaves* linear, very soft, and pubescent. *Panicle* compound, 3–4 inches long, the branches somewhat erect, pubescent. *Spikelets* oblongo-ovate, nearly erect, 5–10 flowered. *Calycine glumes* unequal, acute, carinate, villose, nerved; those of the corolla about the same length.

6. Br. racemosus, panicle erect; spikelets few, on simple peduncles, ovate, subcompressed; florets imbricate, smooth;


Smooth Brome-grass.—Culms glabrous, erect, 1–2 feet high. Leaves linear, acuminate, slightly hairy. Panicle nearly erect, about three inches long. Spikelets smooth, in which, and in the more simple panicle, it principally differs from the preceding species.


Upright Brome-grass.—Root perennial. Culms erect, rather slender, 2–3 feet high, leafy. Leaves; radical ones numerous, narrow, rough; those of the stem broader and less hairy. Panicle slightly branched, 3–5 inches long; the branches rough. Spikelets erect, 5–6 flowered; the florets spreading when in flower. Calycine glumes acute. Outer valves of the corolla nerv-d, scabrous at the back, and tapering into the very straight awn.—Habit of the whole plant that of a festuca.


Hairy Wood Brome-grass.—Culms 4–6 feet high, erect, slender, leafy, smooth upwards. Leaves broad and spreading, rough, hairy; sheaths long, hairy with deflexed hairs. Panicle very lax, widely spreading, drooping to one side, slightly branched. Spikelets about 8 or 9-flowered. Calycine glumes very unequal, scabrous. Awn of the outer valve of the corolla inserted a little below the summit, rough, and shorter than the valve.


Hab. Fields, waste places, road-sides, very common. June, July. 

Barren Brome-grass.—Culms often ascending at the base, erect above, slender, leafy even to the panicle. Leaves spreading, acuminate, plane, rather flaccid and very downy. Panicle very large, drooping gracefully, widely spreading; the branches rough, elongated, slender, almost always simple. Spikelets nodding, rough, 6–8 flowered.—A very common but highly elegant grass.

10. Br. diandrus, panicle erect; spikelets ovato-lanceolate on rather short, subpatent, rarely branched peduncles; florets re-

**Hab.** Walls and waste places. About Edinburgh, not common, Mr Arnott. June, July. ☉

Upright annual Brome-grass.—*Culms* 12–18 inches high, erect, glabrous. Leaves very slightly downy or quite smooth. *Panicule* about 3 inches long, erect, the branches stiff, somewhat patent, short, roughish, simple. Spikelets rough, often pinkish or brownish, about 7-flowered. *Calycine glumes* unequal, very acute. *Florets* diandrous.

23. AVENA.


1. *A. strigosa*, panicle spreading, somewhat compact, pointing one way: calyx containing 2 florets, the outer valves of each having a long dorsal awn, and 2 terminal shorter ones. E. B. t. 1266.

**Hab.** Cornfields. Meadowbank, Mr Neill. July. ☉

Bristle-pointed Oat.—Much resembling, as Smith justly observes, the common oat in habit and size. *Culms* 2–3 feet high, erect, naked as well as the leaves. *Panicule* not much branched; branches slender, secund. *Calycine glumes* a little unequal, white and membranaceous at the margin, containing 2 florets, rarely 3 or 4. *Outer valve* of the corolla with a long awn inserted about the middle, and twice the length of the valve, tipped besides with 2 smaller awns or bristles, which are very characteristic.


**Hab.** Pastures, woods, brakes, waste stony places. Arthur’s Seat; Salisbury Craigs, Mr Neill. Shores of the Frith, Mr Arnott. Very abundant about North Queensferry a little to the eastward. Very fine on the debris of Salisbury Craigs. June, July. ☀

Downy Oat-grass.—Root somewhat creeping. *Culms* 1–3 feet high, erect, glabrous, leafy. Leaves spreading, short, obtuse. *Panicule* erect, subspicate, somewhat inclined to one side. Spikelets erect, spreading when in flower. *Calycine glumes* very unequal. *External valve* of the corolla oblong, jagged at the apex, which in all, is white, scarios and silvery. Apex of the inner valve bifid. *Awn* long, rough, brown, twisted, inserted about the middle.


**Hab.** Hilly pastures and stony waste places. King’s Park; Salisbury Craigs, Mr Neill, 1797, and North Queensferry. July. ☀

Narrow-leaved Oat-grass.—*Culms* tufted, 12–18 inches high, erect, simple. *Leaves* radical or lower ones long, linear, involute, acute; those of the stem deeply striated, with long sheaths; all are smooth on each side, and finely serrate at the margin. Spikelets erect, on short simple peduncles; the uppermost are nearly sessile. *Florets* with their pedicels or recep-
TRITICUM.  TRIANDRIA.  DIGYNIA.

tacles scarcely at all villous. Awn inserted above the middle of the external valve, and is about twice its length.—Somewhat of the habit of the preceding.


Yellow Oat-grass.—Culms erect, numerous, about 1 foot high. Leaves short, plane, linear-acuminate, slightly downy. Panicle shining, erect, 2-3 inches long, of a subpyramidal form, the branches patent, flexuose, rough. Calyx valves unequal, acute, keeled. Pedicels or receptacles of the florets villous. Outer valve of the corolla 5-nerved, with 5 very short, acute points. Awn about twice the length of the valve.—The smallest British species of oat.

24. TRITICUM.

* Spike distichous.


Sea rushy Wheat-grass.—Plant very glaucous. Roots creeping, long, tenacious. Culms erect, very smooth, 1-2 feet high, often purplish at the base. Leaves suberect; linear, involute striated, very smooth beneath, but rough between the striae on the upper surface. Spike 3-5 inches long. Spikelets compressed, sessile, alternate, erect, distichous, very smooth, obtuse, 4-6 flowered. Outer valves of the corolla 5-nerved.


Hab. Fields, hedges, waste places, very common. June to September. 952.

Creeping Wheat-grass. Couch or Quitch Grass.—Root creeping, and rapid in growth. Culms 2-3 feet high, erect, leafy. Leaves spreading, plane, linear-acuminate, rough on the upper surface. Spike erect, 3-4 inches long. Spikelets sessile, smaller, less compressed, and more numerous than in the preceding. All the glumes lanceolato-subulate; the external ones of the corolla 5-nerved, and terminating in a sharp point, which is frequently long enough to be called an awn. Near the sea-shore it becomes glaucous, but cannot be confounded with T. junceum, though in some outward respects similar. It is far more difficult to distinguish it from the following.

3. T. caninum, valves of the calyx very acute, about 5-nerved; florets about 4, awned; leaves plane; root fibrous. Hook.
25. **LOLIIUM.**


Hab. Fields, pastures, road-sides, very common. June, July. *

*Perennial Darnel* or *Rye-grass.*—Culms ascending and geniculate at the base, then erect, 1-2 feet high, glabrous. *Leaves* linear, smooth. *Spike* 2-6 inches long, simple; in very rich soil sometimes branched. *Spikelets* erect, sessile, subacute; alternate, either distant or crowded, many-flowered.

26. **HORDEUM.**


*Wall Barley.*—Culms about a foot high, numerous, decumbent at the base, then erect, spreading, glabrous, very leafy. *Leaves* spreading, acute, rough. *Spike* 2 or 3 inches long, inclined. *Spikelets* distichous, imbricate. *Florets* in threes, the two lateral ones the smallest; all the calyx-glumes with rough, long awns. *Inner valve of the corolla* awnless.
Rotbollia. Triandria. Trigynia.


*Meadow Barley.*—Culms erect, 12-18 inches high, glabrous, leafy below. *Leaves* linear, acuminate, roughish. *Spike* erect, rather longer and more slender than in the preceding. Well marked by all the glumes being rough and setaceous. *Awn* not so long as in the last species.

27. Rotbollia.


β. more slender, spike nearly erect. *R. filiformis*, *Roth.*


*Sea Hard-grass.*—Culms slightly decumbent at the base, erect, 2-8 inches high, very smooth, leafy. *Leaves* spreading, linear, short, acute, rough on the upper surface. *Spikes* 1-2 inches long, round, having the calyx and single, alternate, remote florets, closely adpressed into small hollows in the rachis, except when in flower. *Calycine glumes* acutely lanceolate. *Valves* of the corolla whitish and membranaceous.—The florets are so closely imbedded in the alternate hollows of the rachis, that the spike, except when in flower, seems a continuation of the culm.*

III. Trigynia.


1. *M. fontana*.


*Water Chickweed* or *Blinks.*—Plant smooth and succulent, varying in height according to situation, from 1 to 4 inches long. *Stems* prostrate, radicating, the upper part often erect. *Leaves* opposite, spathulate. *Flowers* minute, white, on short peduncles drooping before flowering. *Stamens* inserted on the corolla. *Capsule* erect, containing 3 reniform dotted seeds. —Plant generally of a pale, and often yellowish green.

* In order to admit this and a few other rare plants, I have passed over my usual boundary; Aberlady Bay being 15 miles from Edinburgh.
IV. TETRANDRIA.

I. MONOGYNIA.

1. DIPSACUS.
(Nat. Ord. Dipsace., Hook. Scot. 2. p. 245.)

1. *D. sylvestris*, leaves opposite, rarely connate; the many-leaved involucre curved upwards; scales of the receptacle straight. 

*Hook.* Fl. Scot. p. 49. 
*E. B. t.* 1032.


*Wild Teasel.*—Stem 3-5 feet high, erect, strong, angular, prickly. 

Leaves; radical ones crenate; cauline ones opposite, unequally serrated, sometimes but rarely connate. 

Involucre composed of many linear, acuminate leaves prickly at the margin, and curved upwards, generally as long or somewhat longer than the head of flowers. 

*Flowers* purple, dense, "each accompanied by a long, prominent, straight, pungent, linear-lanceolate, scale of the receptacle," which, with the upward-curved involucre, and scarcely ever connate leaves, are the chief distinguishing characters from *D. fullonum*, a plant not to be found near Edinburgh.

2. SCABIOSA.
(Nat. Ord. Dipsace., Hook. Scot. 2. p. 245.)

1. *S. succisa*, corollas cleft into 4 equal segments; none of the leaves pinnatifid; heads of flowers nearly globose. 

*Lightf.* p. 114. 
*Hook.* Fl. Scot. p. 49. 
*E. B. t.* 878.

*Hab.* Meadows, pastures, and waste places, common. July, August. 7.

*Devil's-bit Scabious.*—Root premorse (abruptly broken off), dark coloured. 

Stem 12-18 inches high, nearly simple. 

Leaves; radical ones ovate, petiolate; cauline ones oblong, sessile, or shortly petiolate; all hairy, slightly and unequally toothed, never pinnatifid. 

*Flowers* blue, purple, or flesh-colour.

2. *S. arvensis*, corollas unequally 4-cleft, radiating; stem hispid, branched; stem-leaves pinnatifid. 

*Lightf.* p. 114. 
*Hook.* Fl. Scot. p. 49. 
*E. B. t.* 659.


*Field Scabious.*—Root fusiform. 

Stem 2-3 feet high, branched, erect, rough with hairs. 

Leaves; radical ones long, lanceolate, serrated; cauline ones pinnatifid; pinnae distant, often cut. 

Heads of flowers on simple peduncles, purplish or flesh colour; the outer florets by much the largest, cleft into 4 segments, of which 3 are larger, and disposed in a radiated manner round the head.

3. SHERARDIA.

1. *S. arvensis*, leaves about 6 in a whorl; flowers terminal,
Asperula. Tetrandra. Monogynia.


Blue Sherardia.—Plant more or less rough. Stems procumbent, branched, 3–6 inches long, the summit erect. Leaves obovate, acute. Flowers minute, pale blue, in a sort of terminal umbel. Fruit 2-lobed, each lobe crowned with a trifid portion of the calyx.—This slender little plant is of a dark green, and has much the habit of a Galium.

4. Asperula.


Sweet Woodruff.—Root creeping, slender. Stems 6–12 inches high, unbranched, except sometimes at the very base, angular, smooth, clothed at short intervals with whorls of lanceolate leaves (about 3 in a whorl), rough at the edges. Flowers very white, on rather long peduncles branched in a panicled manner. Fruit hispid.—Whole plant, while drying, and afterwards, very fragrant.

5. Galium.


* Fruit glabrous, flowers yellow.


Hab. Dry banks, borders of fields and waste places. Calton Hill, abundant, Mr Neill. Road-side, about 200 yards on the Edinburgh side of Braid Hermitage gate, and about Blackford and Braid Hill.

Yellow Bed-straw.—Root creeping, reddish. Stems erect, 9–18 inches high, angular, branched at the base, very slender. Leaves whorled, linear, deflexed, roughish. Flowers yellow, in a much branched panicle; the branches clustered with the flowers in a corymbose manner. Fruit smooth.


Hab. Hedge-banks, sunny coppices and waste places, frequent. King’s Park, Dr Parsons in Lightfoot. It is still abundant on the right-hand side of the foot-road to Duddingston. May, June. 7.

Crosswort.—Stems 9–18 inches high, branched at the base, weak, simple above, angular. Leaves light green, broad, ovate, softish. Flowers axillary, opposite, in little corymbs, which are more obvious some time after the commencement of flowering, as the peduncles and branchlets elongate. Fertile flowers intermixed with others bearing only anthers.
** Fruit glabrous, flowers white. 


Where Water Bed-straw.—Stems weak, long, straggling, widely branched. Leaves with the margin and keel roughish. Peduncles of the flowers terminal, patent, arranged in ternate panicles, having a 2-leaved involucre at the base of each ternate division. Segments of the corolla broad, subacute. Fruit obscurely dotted, smoothish.


Smooth Heath Bed-straw.—Root very creeping. Stems much branched, very slender at the base, smooth. Margin of the leaves sometimes rough, according to Smith. Flowers very abundant, pinkish while in the bud, when expanded, very white; primary peduncles simple, supporting a ternate corymb. Fruit, according to Smith, granulated.


_Hab._ Hedges, moist places. Fish-wives' Causeway near Portobello, Maughan. July. 9.

Upright Bed-straw.—Stems erect, lax, much branched, smooth, sometimes roughish at the angles, (Smith.) Leaves remarkable from the prickly serratures pointing forwards. Panicle terminal and lateral, much branched, yet not very diffuse, many-flowered; branchlets slender and smooth. Segments of the corolla acuminate.


Least Bed-straw.—Stems many, about 8 inches long, suberect, branched, either “hispid with short patent hairs,” or smooth (in my specimens the former). Leaves entire, lanceolate, very acute, subrevolute, more or less hairy. Panicle lateral and terminal, the branchlets or primary peduncles quite smooth, the secondary ones ternate. “Fruit very smooth,” Smith. My specimens from the Pentland Hills agree perfectly with Smith's description; the leaves in mine are more or less pilose, even to the uppermost whorl; but the stem is completely smooth. The whorls are crowded at the base, and the leaves small and obovate. I have never seen the fruit.

_Hab._ Hedges and waste shady places, rare. By the road-side at Four-mile Hill, between Corstorphine and Kirkliston, Maughan. This station is confined, but abundant, especially on the field-side of the hedge in which it grows. July, August. Ƥ.

_Great Hedge Bed-straw._—Stems according to situation 1–4 feet high, weak, procumbent at the base, branched in a straggling manner, swoln at the upper whorls, smoothish. _Leaves_ elliptical above, and more mucronate than in the lower whorls, where they are extremely obtuse almost oblongo-spathulate, and with a very short sudden point. _Panicule_ much branched, commencing often half way down the stem; irregularly subdivided. _Flowers_ very numerous, white; segments of the corolla mucronate.

** Fruit hispid.**


_Hab._ Hedges and waste grounds, extremely common. June, July. Ƥ.

_Goose-grass or Cleavers._—Stem very long, weak, straggling, angular, branched; the angles very rough. _Leaves_ exceedingly hispid, mucronate, entire. _Flowering peduncles_ lateral and terminal. _Flowers_ minute, white. _Fruit_ hispid with bristles, the bristles hooked.

6. **PLANTAGO.**


*Leaves ovate.*


_Hab._ Pastures and road-sides, common. June, July. Ƥ.

_Greater Plantain._—Leaves all radical, large, often toothed, most of them spreading, 7-nerved, nearly smooth. _Scapes_, including the spike, 6–12 inches high, erect, firm, rounded. _Spike_ very long, dense, a few flowers at the base, distant. _Calyx_ of 4 minute leaflets. "At the base of each flower a concave bractea;" *Hook.* The many-seeded cells of the capsule is a striking distinction between this and the following, with which it can alone be confounded.


_Hab._ Pastures and banks, rare near Edinburgh. Roman Camp above Newbattle, plentiful. Road-side between Inveresk and Pathhead, 9 miles SE. from Edinburgh, Maughan. June, July. Ƥ.

_Hoary Plantain._—Root large and woody. _Leaves_ all radical, spreading, appearing sessile, but having very short footstalks, mostly pubescent, 7–9
nerved. Spike shorter than the last, rounded, bearing a spike about an inch and a half, or two inches long. Flowers very dense. Cells of the capsule 1-seeded.

** * * Leaves lanceolate or linear.


Hab. Meadows and pastures, common. June, July. ¶.

Ribwort Plantain.—Leaves erect, 3–5 nerved, attenuated at each extremity, deep green. Scape 6–12 inches high, angular. Spike ovate or oblong, very dense. Bracteas blackish, one to each flower, which gives the whole spike a black aspect, especially when not in flower.


Sea-side Plantain.—Leaves deep green and fleshy, mostly entire, but often toothed. Spike dense, narrow. Flowers minute.—Plant varies much in size according to situation, 2–12 inches high.


Hab. Chiefly on the sea-coast, in dry rocky spots and on walls. June, July. ¶.

Buck's Horn Plantain.—Leaves spreading, generally close to the ground in a radiated manner, more or less pinnate and pubescent. Scape rounded, more or less pilose. Spike cylindrical or oblong. Flowers dense, small. Capsule 4-celled, with 1 seed in each.—Plant varies much in size, but is usually 3–6 inches high.

7. EPIMEDIUM.


1. E. alpinum.


Hab. Woods and coppices, rare. Hunters' Tryste, Dr Hastings. May, June. ¶.

Barren-wort.—Root creeping. Stems "erect, simple, bearing a compound triternate leaf; base of the petioles swollen; leaflets heart-shaped, extremely delicate, ciliate at the margin, hairy beneath, cordate, serrate, lateral ones unisegmental," Hook. Flower-panicule pedunculate; the peduncle arising from the same point as the leaf; the part is swollen, and is the base of the petiole; below this part is the proper stem; the panicle is somewhat branched and shorter than the leaf. Flowers nodding, red, furnished with a curious inflated, membranaceous, whitish nectary. Anthers remarkable, 2-celled, with 2 valves resembling lids, which, opening and springing back, give exit to the pollen.

8. CORNUS.


1. C. sanguinea, arborescent, branches straight; leave ovate,
Parietaria. TETRANDRIA. MONOGYNIA. 39


Wild Cornel-tree or Dogwood.—A shrub 3–5 feet high. Branches smooth, red. Leaves opposite, petiolate, entire, glabrous, strongly veined, changing to a red colour before falling off. Cymes terminal, flattish, white, with a heavy smell. Fruit dark purple, globular, bitter berries.


Hab. Moist alpine pastures and declivities. Pentland Hills, Dr Hope. It has never been found since, and is a prize well worth searching for in this neighbourhood. In the Highlands "it is not unfrequent." July, August. 2.

Dwarf Cornel.—Root creeping. Stems erect, 3–6 inches high, angular. Leaves opposite, ovate, acute, ribbed. Umbel of flowers situated in the axil of 2 little branches which terminate the stem, shortly pedunculate, and having a showy 4-leaved involucre, which completely surrounds it. Fruit a few red Drupes of a sweetish taste.

9. PARIETARIA.


Hab. Walls and waste places among ruins. Burntisland, Lightfoot. Ruins of Inchcolm and of Craigmillar Castle, Mr Neill. Walls by the Water of Leith near Canonmills. The whole summer. 3.

Pellitory of the Wall.—Stems numerous, leafy, branched, angular, reddish, 12–20 inches high. Leaves dark green, entire, hairy, petiolate. Flowers axillary, in threes; central one having a pistil only. Filaments of the stamens curiously jointed and elastic, by which property the pollen is more completely discharged.

10. ALCHEMILLA.

(Nat. Ord. ROSACEA, Hook. Scot. 2. p. 264.)


Hab. Pastures, woods and brakes, road-sides, abundant. June, July. 4.

Common Lady's Mantle.—Plant 6–14 inches high, bright pleasant green. Stems partly procumbent, erect, round, hairy, branched. Radical leaves elegant, on long petioles, large, roundish, lobed, more or less hairy; stems leaves small, nearly sessile, with 2 deeply-toothed conuate stipules. Flowers numerous, in lax, but not weak corymbose clusters, yellowish-green.

2. A. arvensis, leaves 3-lobed, pubescent, the lobes irregularly and deeply cut; flowers sessile, axillary. Hook. Fl. Scot.
II. TETRAGYNIA.

11. ILEX.


1. I. aquifolia, leaves ovate, acute, spinous. Lightf. p. 121.

Hab. Woods and hedges. Road leading from Craigleith quarries, Mr Neill. Rosslyn woods. June, July. Ș.

Common Holly.—A very ornamental evergreen tree, with a smooth bark. Leaves rigid, petiolate, dark on the upper surface, paler beneath, the margin cartilaginous, and divided into spinous lobes; the upper leaves sometimes entire. Flowers white, in axillary clusters. Fruit numerous, bright scarlet berries.

12. POTAMOGETON.


* Upper leaves floating.


Hab. Ponds, lakes, slow streams. Water-pits at Corstorphine Hill. July. Ș.

Broad-leaved Pond-weed.—Stems varying in length, sometimes many feet, round, leafy. Upper leaves floating, coriaceous, veined, on long petioles, green or tinged with brown; lower leaves linear-lanceolate, submersed, tapering gradually into a foot-stalk, in which this differs from the following species. Stipules large, pale, membranaceous, concave, nearly as long as the petiole. Flower-peduncles with a similar appendage, thick and succulent. Spikes 1–2 inches long, rising above the water.


Long-leaved Floating Pond-Weed.—Stems often very long, branched, leafy. Upper leaves somewhat coriaceous, subelliptic, finely veined, reddish, on short footsticks; lower leaves very long, membranaceous and sessile. Stipules broadly lanceolate. Peduncles short. Spikes an inch long, almost submersed.

** Leaves all submersed.

3. P. densum, leaves ovato-acuminate, opposite, sessile, crowded; spike about 4-flowered on very short peduncles. Lightf.
Potamogeton. TETRANDRIA. TETRAGYNIA. 41


HAB. Pools and ditches. Corstorphine Hill, Dr Parsons in Lightfoot. (It is there still.) Ditches in the King's Park, Maughan. June, July. ℞.

Close-leaved Pond-weed. — Stems dichotomous, varying in length, densely clothed with leaves of a bright green colour, especially towards the summits of the branches. Spike of flowers very small, and on an extremely short peduncle.


Shining Pond-weed. — Stems long, wholly submersed, nearly simple. Leaves alternate, entire, plane, or slightly waved, ribbed, pellucid, remarkably shining, on short petioles. Stipules as long as the portion of the stem between each leaf, large, rather obtuse. Spike 1–2 inches long, dark green, much crowded with flowers, and rising above the surface about midsummer. — The leaves are sometimes ovate, and then forms the var. 2. of Withering, which is also that figured in E. B.


HAB. Ditches and ponds. Lochend and Duddingston Loch, abundant. June, July. ℞.

Curled Pond-weed. — Stems long, much branched, very leafy upwards. Leaves sometimes opposite at the top, obtuse, pellucid, dark green, and crisp to the touch, as well as to the eye. Peduncles as long as the leaves, bearing a small spike of 6–10 brownish flowers. — A common but handsome species.


HAB. Ditches and pools. Ditch by the Flintmill, Musselburgh, Maughan. July. ℞.

Small Pond-weed. — Stems alternately branched, slender. Leaves very narrow, patent, not sheathing the stem, opposite only under every flower-stalk. Stipules amplexicaul, much broader than the leaves. Peduncles axillary, short, terminal, at length lateral by the stem shooting past them. Spikes ovate, small, dense, few-flowered.— Character and description from Smith. I am not more fortunate than Dr Hooker in possessing specimens; indeed never saw the plant.


Fennel-leaved Pond-weed. — Root arising from a sort of small tuber, creeping. Stems long, branched, very slender, flexuose. Leaves plane, very seta-
ceous, alternate, regularly distichous, with long sheaths. Stipules closely attached to the leaves, small, membranaceous. Spike interrupted, few-flowered. Flowers olivaceous.

13. RUPPIA.
(Nat. Ord. Fluviales, Hook. Scot. 2. p. 192)

1. R. maritima.


Sea-Ruppi.a.—Stems very slender, filiform, flexuose, branched, leafy. Leaves long, setaceous, sheathing. Spadix very short at first, and included in the sheaths. "The flowers, both from their minuteness and situation, are not easily to be seen, being half concealed by the sheathing base of the leaves, which thus fulfils the office of a spathe. The anthers are very large; eight of them are placed in fours without any true perianth to separate them. In the centre of each set of anthers are placed the 4 ovaries, small, and resembling tubercles. The whole fructification is of one uniform pale green colour. No sooner have the anthers fallen away, than the ovaries swell into a pericarp, which becomes lengthened at the base, and by the time it is fully formed, terminates a fruit-stalk of an inch or more in length. The spadix seems equally endowed with this curious power of elongation; for during the flowering of the plant, I have always observed this to be very short, but when bearing capsules, to be more or less lengthened out and spirally twisted, in order that the fruit may always be level with the surface of the water, a phenomenon which is well known to exist in a remarkable degree in the Vallinameria spiralis;" (Hooker's admirable illustrations in Flora Londinensis.)

14. SAGINA.
(Nat. Ord. Caryophyllae, Hook. Scot. 2. p. 279.)


Hab. Sandy and gravelly places, common. June, July. 71.

Procumbent Pearlwort.—Stems many, 2-4 inches long, glabrous, radiating at the joints. Leaves linear, subulate, connate, convex beneath, plane above, smooth. Flowers drooping before flowering, axillary, on slender peduncles, which are longer than the leaves. Petals white, half the length of the 4-leaved calyx. Capsule ovate, longer than the calyx.


Hab. On the sea-coast. Queensferry, and near Edinburgh, G. Don. May to August. 0.

Sea-Pearlwort.—Stems numerous, branched, 2-4 inches high, somewhat decumbent at the base, divaricate, often reddish. Leaves very short, fleshy, obtuse, connate and membranaceous at the base. Flowers on lateral and axillary or terminal peduncles, half an inch or more in length, slender. Calyx-leaves broad, ovate, obtuse, with a white membranaceous margin. Capsule not longer than the calyx, thus differing from every other with which it might be confounded.
V. PENTANDRIA.

I. MONOGYNIA.

1. MYOSOTIS.


Hab. Woods and coppices, common. Summer. 2.

Wood Scorpion-grass.—Perennial. Stems 12-18 inches high, rather lax, with soft spreading hairs. Leaves; radical ones spatulate; cauline ones rather broad, oblong, obtuse. Racemes very long. Pedicels short while in flower, afterwards elongate and patent, at length erecto-patent, twice as long as the calyx. Hairs of the calyx patent, and hooked, the uppermost longer and erect. Flowers large, bright pale blue.


Water Scorpion-grass.—Root creeping. Stems 12-20 inches high, thickish, and succulent, often drawn up by growing among tall herbs, when it becomes weak and straggling. Leaves often numerous. Racemes not so long as in the preceding, and the flowers more crowded. Hairs of the calyx erect, straight; those of stem and leaves mostly appressed. Flowers very large, pale blue.


Hab. Fields, waste places, road-sides, common. June, July. 2.

Field Scorpion-grass.—Stems 6-18 inches high, hairy with patent sub-rigid hairs, branched; branches divaricate. Cauline leaves in small specimens ovate; in larger ones oblong, rough with hairs. Racemes (in fruit) long. Pedicels twice as long as the closed calyx. Hairs of the calyx hooked. The pedicels when in fruit are much longer in this than in the following species. E. B. t. 2558. is certainly M. versicolor. The character and description would serve equally well for either.

4. M. versicolor, "leaves oblongo-lanceolate, hairy; racemes very long; pedicels (in fruit) erect-patent, shorter or as long as the 5-cleft acute closed calyx; limb of the corolla patent,
PENTANDRIA. MONOGYNIA. LITHOSPERMUM.


Hab. Dry banks and pastures, sometimes in bogs, frequent. Abundant in the King’s Park, especially on the bank at the left-hand side going towards Duddingston from St Leonard’s. Side of Duddingston Loch, very large. June, July. ☇.

Yellow and Blue Scorpion-grass.—Stems rather rigid, 1-18 inches high, according to situation on a dry bank, or drawn up in a weedy marsh, branched; the branches very divericate. Leaves by no means numerous, except in the smaller specimens. Racemes very long, slender. Pedicels never longer than the calyx, the hairs of which are patent and hooked. Flowers very small, yellow and blue, retaining, according to Lehman, their respective colours. The chief distinguishing mark is the short pedicels. The length of the calyx is not to be depended upon.—At Duddingston Loch this plant is extremely branched, 18 inches high, and the racemes themselves often 8 inches.

2. LITHOSPERMUM.


Hab. Fields and waste places, rare. Under the west side of Salisbury Crags, and at Rosslyn, Dr Parsons. Arniston woods, Maughan. June. ☇.

Common Gromwell.—Stems erect, 1-2 feet high, roundish, covered with rigid appressed hairs. Leaves alternate, broadly lanceolate, entire, very rough on the upper surface. Flowers pale yellow, in a leafy obtuse, recurved spike, which becomes erect when in fruit. Fruit (nuts) whitish-brown, ovate, polished, rarely more than two coming to maturity.


Hab. Corn-fields. About Edinburgh, but in no fixed station. May, June. ☇.

Corn Gromwell.—Root reddish, staining. Stems branched, rough. Leaves rather obtuse, rough, hairy, rigid. Flowers white, solitary in the axil of the leaves, the lower ones becoming remote as the plant advances in growth. Calycine segments linear-lanceolate, hispid, at length patent. Fruit (nuts) brown, rugose.


Sea Gromwell.—Stems much branched. Leaves ovate, waved, very glau-
cous, the lower ones acute. Corolla with a short thick tube; the limb very shortly and obtusely 5-cleft, pinkish-blue. Fruit (nuts) smooth.—Plant strongly resembling oysters in taste; turning black in drying.

3. ANCHUSA.


Evergreen Alkanet.—Root fusiform. Stems rough and hairy, 1–2 feet high, erect, angular, branched. Leaves acute, deep, dark green. Corolla splendid blue, almost salver-shaped, cleft into 5 rounded lobes; the centre closed by valves, from which a white line passes to each lobe.

This species approaches Myosotis, in the corolla being more salver-shaped than infundibuliform, as Smith observes in E. B.

4. CYNOGLOSSUM.


Hab. Banks and waste places. Burntisland and Kinghorn, Lightfoot. Rosslyn Castle; and on Inchoom, Mr Neil. Guillon Links abundant; and at Gosford more sparingly, Dr Graham. It occurs on the rough bank by the sea-shore midway between Burntisland and Pettycur. June, July. 2.

Common Hound's-tongue.—Plant soft and downy. Stems 1–2 feet high or more, erect, round. Leaves; the radical ones large, petiolate; the stem ones subamplexicaul, entire, flexuose. Flowers in terminal branched recurved racemes, shortly pedicellate, dull red, cleft into 5 round lobes. Fruit rough with hooked prickles.—Plant smelling strongly like mice.

5. PULMONARIA.


Hab. Woods. Arniston woods, abundant; banks of the N. Esk, near Kevockmill, Maughan. May. 2.

Common Lungwort.—Stem about a foot high, erect, somewhat angular, simple, very rough. Leaves rough, harsh; radical ones on long petiols; cauline ones shortly petiolate below, and lanceolate above, ovate, sessile; they are frequently variegated with whitish-green spots. Racemes two, terminal, shortly clustered. Calyx hairy. Flowers flesh-coloured, changing as soon as expanded to purplish-blue; the tube a little longer than the calyx.

6. SYMPHYTUM.

1. S. officinale, leaves ovato-lanceolate, very decurrent, and

**Hab.** Moist woods and banks of streams. Water of Leith, opposite St Bernard's Well, Dr Parsons. Craigrook, Mr D. Steuart. May, June. 2.

**Common Comfrey.**—Root blackish. *Stems* 1–3 feet high, succulent, hispid with deflexed hairs, very leafy, and winged, especially above. *Leaves; radical* ones on long petioles, rough. *Cauline* ones ovato-lanceolate below, lanceolate above, sessile, subamplexicaule, very decurrent, more or less flexuose at the margin. *Flowers* in 2 branched clusters, yellowish-white, or purple.


**Hab.** In the same situations as the last. Opposite the New Well at the Water of Leith, Mr Yalden *. Colinton woods; Woodhall; banks of the N. and S. Esk, Maughan. Slateford, Mr Bainbridge. Banks of the river about a mile above Lasswade. July. 3.

**Tuberous-rooted Comfrey.**—Root whitish. *Stems* shorter than the preceding. *Uppermost leaves* mostly opposite. *Flowers* yellowish-white, in a branched subraceme-like cluster, terminal, divided at its base into 2 main branches, rough. *Calycine segments* more linear, and longer than the last.—Plant with the same habit as the last, but distinguished easily by the above description.


**Hab.** Rubbish and waste places. Burntisland, Maughan. Debris of Salisbury Craig, Mr Bainbridge. June, July. 4.

**Common Borage.**—Whole plant very hispid. *Stems* much branched, very divaricate, succulent. *Cauline leaves* more or less toothed, all alternate, the upper ones sessile, amplexicaul. *Flowers* large, fine blue; the petal acute.


**Hab.** Waste places, rare. Guillon Links, Messrs Arnott and Stewart. June, July. 5.

**German Madwort.**—Stems procumbent, angular, straggling, very rough, with short hooked prickles. *Leaves* oblong-lanceolate acute, opposite, or in threes or even fours, the lower ones petiolate; hispid with prickles pointing forwards. *Flowers* small, axillary, purple, on very short peduncles.

* St Bernard's Well and the New Well are synonymous, and I fear Dr Parsons's plant may be Mr Yalden's, or *vice versa.*
LYCOPSIS. PENTANDRIA. MONOGYNIA. 47

which are curved downwards when in fruit. Calyx becoming much larger after flowering.

9. LYCOPSIS.


Hab. Corn-fields and waste places, very common. June, July. ☐.

Small Bugloss.—Stem erect, 12-18 inches high, bristly, branched; branches erect. Leaves; radical ones, and those on the lower part of the stem, petiolate; the superior ones sessile, subamplexicaul. Racemes two, terminal, leafy, obtuse. Flowers rather small, bright blue, with a white centre. Fruit tuberculate, rugose.

10. ECHIUM.


Common Viper’s Bugloss.—Stem thickish, firm, very erect, round, 1-3 feet high, pyramidal, and crowded with spikes. Leaves; radical ones petiolate, spreading, long. Spikes very numerous, from the axils of the stem leaves, recurved, but gradually becoming erect as the flowering proceeds. Flowers large, red in the bud, a fine blue when expanded, densely crowded on the spike.—The whole plant excessively hispid, even bristly. It is one of our most splendid vegetables, and no painting can do justice to its colours.

11. PRIMULA.
(Nat. Ord. Primulaceae, Hook. Scot. 2. p. 211.)


Hab. Woods and brakes, hedgebanks, abundant. King’s Park, Mr Bainbridge. Granton woods; Rosslyn and Auchindenny woods. Braid Hermitage. April, May. ☑.

Common Primrose.—Leaves all radical, ovate, gradually tapering to a petiol, rugose and dark green above, very veiny and pale beneath, margin denticulate. Scapes 4-7 inches high, numerous, slender. Flowers large, pale yellow, 5-lobed; the lobes obcordate.—A variety is sometimes found with pale purplish flowers.


PENTANDRIA. MONOGENIA. MENOANTHES.

Common Cowslip.—Leaves obovate, all radical, very rugose, bright green above, beneath venose and pale. Scape 3-7 inches high, erect, bearing a many-flowered umbel. Flowers on slender drooping pedicels. Corolla small, tawny yellow, the limb concave, paler beneath; segments shortly obcordate.


Hab. Woods and hedgebanks. Colinton; sea-coast between Queensafray and Inverkeithing; woods about Starley Burn, near Burntisland, in great abundance, Maughan. April, May. ¥.

Oxlip.—Leaves the same as the last, except being often contracted below the middle, which is however not constant. Scaep few, erect, 1-6 inches high. Flowers smaller than the preceding, umbellate, pedicellate; the pedicels filiform, of different lengths, some often drooping.—Supposed by many botanists to be a hybrid between P. vulgaris and P. Veris.


Hab. Moist pastures and bogs, rare. Boggy ground above Woodhouselee, Maughan.

Bird’s-eye Primrose.—Leaves, the outermost sometimes almost roundish; numerous, veiny beneath, and farinose. Scape 6-12 inches high, erect, farinose, umbellate. Flowers red, pale beneath, the segments obcordate and distant, the orifice furnished with much smaller glands than P. Scotica of Hooker, the character of which is, “calyx ventricose; limb of the corolla plane, the orifice glandulose; segments broadly obcordate, approximate.” No part of the latter plant is so farinose as P. farinosa, it seldom exceeds 2 or 3 inches; the flowers are purple, and the umbel fewer-flowered, and more dense. The stamens in P. farinosa are at the very mouth of the tube; in P. Scotica lower down. The latter is probably only to be found in the extreme north of Scotland, and was long taken for the other.

12. MENYANTHES.


Hab. Shallow pools, marshes and bogs, common. Duddingston Loch; Braid Hills; Pentland Hills. June, July. ¥.

Common Buckbean.—Roots long, creeping, passing into the stems, which are very succulent, round, leafy, branched, procumbent, ascending at the summit. Leaves sheathing, petiolate, very smooth. Flower-stalk about 6 or 8 inches high, round and succulent. Flowers 5-cleft, spiked, shortly pedicellate, beautifully and densely fimbriated on their upper surface, pinkish-white.

13. LYSIMACHIA.


1. L. thyrsiflora, flowers in pedunculate lateral racemes;

Hab. Watery places, rare. Duddingston Loch, D. Don. July. Υ.

_Tufted Loosestrife._—Root creeping. Stems erect, 1–2 feet high, simple. Leaves sessile, acute, smooth, entire. *Racemes* erect, spiked, axillary, opposite. Corolla fine yellow, spotted with orange, deeply cleft into lanceolate segments.—I do not know how long ago Mr D. Don found this species in the annexed station; at present I suspect it scarcely exists there, as I have searched in vain for it, and no other botanist has been more fortunate.


Hab. Woods and shaded moist banks, frequent. Rosslin and Auchindenny woods. The whole summer. Υ.

_Yellow Pimpernel*, or _Wood Loosestrife._—Stem branched, creeping, radiating, reddish, 6–14 inches long, slender, angular. Leaves bright green, entire. Peduncles slender, wiry, flexuose, 1-flowered. Corolla lively yellow, cleft into 5 ovate-acute lobes. Stamens smooth.—(In _L. nummularia_ they are glandulose).

14. **ANAGALLIS.**


Hab. Corn-fields, common. June, July. Ω.

_Scarlet Pimpernel._—Stems much branched, square, smooth. Leaves entire, longitudinally veined. Flowers bright scarlet, on solitary, axillary peduncles. Capsule globose.


Hab. Bogs. Marshy ground on the banks of the Esk, near Inveresk, and Guillon Links, Maughan. Queensferry, Mr Stewart. Hunters' Bog, King's Park, Mr Bainbridge. July, August. Υ.

_Bog Pimpernel._—Stems branched, radiating, very slender, 2–3 inches long. Leaves opposite, subacute, very shortly petiolate and very small. Peduncles axillary, 1-flowered. Flowers rather large, very beautiful and delicate pink, finely veined, deeply 5-cleft; the segments ovate, subacute. Capsule globose.

15. **CONVOLVULUS.**


Hab. Corn-fields, dry banks, road-sides, frequent. Piershill Barracks,
and near Lochend, Mr Neil. Kirkcaldy abundant, especially towards the sea-shore, Mr Arnott. Fields about Leith Links, Mr Bainbridge. River-side below Canommills, Mr D. Steuart. Road-side east from Canommills. Road-sides about Newhaven. June, July.  ፪.

*Small Bind-weed.*—Root creeping. Stems 1–3 feet long, climbing, often prostrate from the absence of any support, slender, angular, twisted. Leaves alternate, petiolate, smoothish. Peduncles axillary, mostly 1-flowered, longish, bearing the minute bracteas a little above the middle. Flowers about an inch broad, pale rose-colour, varied with white.—It propagates prodigiously fast by the roots. Seeds are seldom perfected.


Hab. Hedges and woods, rare. Hedge by the road-side leading from the Abbeyhill to Leith, Dr Yule. Road to Newhaven by Pilrig, Mr D. Steuart. July, August. ፪.

*Great Bind-weed.*—Root creeping. Stems climbing, extending to many feet, angular, twisted, branched. Leaves large, alternate, petiolate, smooth. Flowers large, handsome, 2 inches broad, white, on 4-sided, 1-flowered, simple peduncles. Calyx-leaves lanceolate, smaller than the bracteas.

16. **POLEMONIUM**.


*Jacob's Ladder.*—Plant wholly smooth. Stems erect, 1–2 feet high. Leaves alternate; leaflets numerous, elliptic-lanceolate, deep green. Flowers in a terminal, somewhat compact panicle, large, blue, campanulate, deeply and broadly 5-lobed.

17. **CAMPANULA**.


Hab. Pastures and waste places, very common. August, September. ፪.

*Round-leaved Bell-flower.*—Root rather woody. Stems erect, slender, round, branched, about a foot high. Leaves; the radical ones on long slender petiols, soon withering, which the student should be aware of; cauline ones sessile, alternate. Flowers in a sort of lax panicle, drooping. Calyx-segments lanceolate-subulate, entire, spreading.—The corolla is sometimes white.


Spreading Bell-flower.—Stem erect, 2-4 feet high, slightly hairy. Leaves alternate, subpetiolate, large. Peduncles 1-flowered, axillary from the upper leaves. Flowers large, purple, the lobes somewhat reflexed. Calyx deeply cleft; segments lanceolate, serrate.


Hab. Woods and fields, rare. Corn-fields two miles NW. from Kirkcaldy, Mr Chalmers. July, August. 7.

Creeping Bell-flower.—Root creeping. Stem erect, 1-2 feet high, round, rather hispid with deflexed hairs. Leaves; radical ones petiolate; cauline ones sessile, becoming narrower upwards. Flowers large, on very short peduncles. Segments of the calyx linear, patent-reflexed, entire, rough.


Clustered Bell-flower.—Stem simple, 4-12 inches high, roughish. Leaves; radical ones oblong-lanceolate, sometimes subcordate, petiolate. Flowers mostly quite terminal in a dense cluster, moderate size, deep purple. Calycine segments lanceolate, often hairy.

18. Viola.


* Stipules undivided.


Hairy Violet.—Stem none. Stolons short, prostrate, not taking root. Leaves on long hairy petioils, serrate, hairy on both sides. Stipules radical, lanceolate, unequally serrate. Peduncles longer than the leaves, 3-5 inches, smoothish, having below the middle a pair of smooth lanceolate bracteas. Flower pale blue, scentless. Capsule roundish, hairy.


Sweet Violet.—Stolons long, leafy, taking root. Leaves broadly heart-shaped, on long, erect, petioils, serrate. Stipules very pale, lanceolate, serrate. Peduncle 2-4 inches high, bearing above the middle a pair of lanceolate bracteas. Flower fine purple or white, very sweet. Capsule oblong.

**Natural History**

HAB. Bogs and marshy grounds. Ravelrig toll moss, Mr Arnott. Pentland Hills; Rosslyn woods, Mr Neil. King's Park. May, June. 4.

*Marsh Violet.*—Root creeping. Leaves acute, or quite obtuse, sometimes very small, but increasing much in size and height after flowering, veiny, sometimes purplish beneath. Stipules lanceolate, almost entire, purplish. Peduncles 2–3 inches high, with a pair of small, lanceolate bracteas about the middle. Flowers very pale blue, marked with dark, branched streaks, scentless. Spur of the corolla very short, obtuse.


**Natural History**

HAB. Woods, hedge-banks, &c.; very common. April, May. 4.

*Dog's Violet.*—Root straggling, woody. Stem gradually evolved, rather weak, grooved, branched. Leaves on footstalks, varying much in size, crenate. Peduncles axillary, obtusely 4-sided, 2 or 3 inches high, bearing towards the summit a pair of acute bracteas. Flowers blue, scentless. Capsule oblong.—One of our most common species, rendering our banks brilliant, after the sweet violet has passed away.

**Stipules deeply divided.**


**Natural History**

HAB. Corn-fields, waste places, very common. The whole summer. 0.

*Pansy Violet,* or *Heart's-ease.*—Root very small. Stem weak, 3–10 inches high, very leafy. Leaves alternate, varying in shape from ovate to oblong or oblong-lanceolate, petiolate, more or less slightly hairy. Stipules in pairs at the base of each leaf, connate, pinnatifid, with a large terminal, crenate lobe. Flowers vary much in size and colours, on long peduncles, bearing very minute bracteas. Lower petal of the corolla mostly yellow or whitish, the others some shade of purple.


**Natural History**

HAB. Hilly pastures. Arthur's Seat, Mr Neil. Corstorphine and Pentland Hills, Maughan. Braid and Blackford Hills. June to September. 4?

*Yellow Mountain Violet.*—Stem 3–5 inches high, bearing seldom more than 2 or 3 flowers, on long axillary peduncles from the upper leaves. Leaves similar in form to the preceding, "finely fringed," (Sm.) Stipules large, palmate, segments 5, linear-oblong. Flowers large, showy, all yellow or partly purple, sometimes wholly so. Calyx toothed at the base.—In the other parts it resembles the preceding, of which it is perhaps nothing more than a variety.
19. VERBASCUM.

(Nat. Ord. SOLAN. E., Hook. Scot. 2. p. 222.)


Great Mullein.—Stem erect, 3-5 feet high, leafy, winged, tomentose. Leaves very woolly, alternate, ovato-oblong. Spike long, terminal, erect, very dense. Flowers bright yellow. Stamens unequal in length, yellow, hairy.


Hab. Waste places, road-sides. Near Boglehill, east of Cockenzie, Mr Neill. Links between Seaton and Gosford, Dr Yule. Banks of the river Esk opposite Coal-pits, and at Borthwick Castle, Maughan. July, August. 78.

Dark Mullein.—Stem erect, 3-4 feet high, angular, striated, branched. Leaves very veiny, nearly glabrous, dark green, the radical ones on very long petiols; those of the stem becoming less and less petiolate upwards. Spike long, mostly solitary, somewhat lax, erect. Flowers golden-yellow. in small clusters, pedicellate. Stamens covered with fine purple hairs. Anthers orange.

20. HYOSCYAMUS.

(Nat. Ord. SOLAN. E., Hook. Scot. 2. p. 223.)


Common Henbane.—Root fusiform. Stem round, firm, 12-16 inches high, very leafy. Leaves large, alternate, broadly oblong. Spike terminal, recurved, obtuse, leafy. Flowers, few open at once, deeply 5-lobed, erect, yellow, finely marked with numerous dark purple veins. Calyx 5-cleft, veined, persistent.—Whole plant viscid; powerfully narcotic.

21. ATROPA.

(Nat. Ord. SOLAN. E., Hook. Scot. 2. p. 223.)


Hab. Hedges and waste places. Sea-side immediately west of the wagon road from Limekilns. On Inchcolm, and near the ruins of Borthwick Castle, Mr Neill and Maughan. June, July. 78.

Dwale, or Deadly Nightshade.—Root very thick and fleshy. Stems 2-4 feet high, rounded, branched and numerous. Leaves lateral, in pairs, one always smaller than the other, petiolate, dull dark green. Peduncles solitary, axillary, 1-flowered, rather short. Flowers lurid purple, large, drooping. Calyx viscid. Fruit shining black, as large as a small cherry, 2-celled.—Highly poisonous.
22. SOLANUM.
(Nat. Ord. Solanae, Hook. Scot. 2. p. 228.)


Hab. Moist hedges. At the end of Dalkeith nearest to Edinburgh, Dr Parsons. Banks of the Esk above Musselburgh, and by the Water of Leith near Gorgie, Maughan. Between Burntisland and Staryburn, Mr D. Steuart. June, July. 7.

Woody Nightshade, or Bitter-sweet.—Root woody. Stems shrubby, slender, straggling, several feet high. Leaves smooth, alternate, petiolate; the lower ones cordate, in shady places often very large. Flowers in very lax, divaricate, branched corymb, purple, deeply 5-cleft, the segments reflexed with two green tubercles at the base of each. Anthers large, yellow, united into a sort of long cone. Berries bright red, oval.—Very poisonous.

23. ERYTHRÆA.
(Nat. Ord. Gentianeæ, Hook. Scot. 2. p. 228.)


Hab. Dry pastures: Black Jock’s Hill, near Burntisland; Dalhousie Castle; Dumearn Hill, Mr Neil. Hill at North Queensferry, plentiful, Mr D. Steuart. July, August. 2.

Common Centaury.—Stem 3–12 inches high, often simple, angular, erect. Leaves; radical ones spreading, rather broader than the cauline ones, all ovate-oblong, with three main nerves. Flowers in a branched, lax, irregular, fasciculated corymb, pink. Limb of the corolla cleft into 5 ovate segments, patent in sunny weather, but closing in bad weather, and almost immediately after gathering. Calyx as in the two other British species, deeply cleft, with linear-lanceolate erect segments, which in the present species are usually about half the length of the tube of the corolla.


Dwarf-branched Erythrea.—Whole plant 1–4 inches high. Stem angular, very short, branched from the base, dichotomous, slender, spreading, “a single flower-stalk between the branches;” Hook. Flowers slenderer and smaller than the preceding.

Lonicera.  Pentandra.  Monogynia.


Dwarf Sea-side Erythraea. Stem simple or branched, 2–3 inches high, leafy, angular. Radial leaves ovate-oblong. Flowers in a rather dense terminal corymbose head, sessile, large, the segments obtuse. I have specimens gathered by Mr Maughan in the above-mentioned station. The most striking character seems to be the form of the stem-leaves, which, besides being linear, have a decided tendency to become obovate. The margin of the stem-leaves I have observed in this species to be very minutely dentato-ciliate, and even the nerves on the back to be slightly rough. Specimens from the coast of Northumberland, and kindly sent to me by Mr Winch, possess the same characters.


Hab. Watery places, especially near the sea. Limekilns, Fifeshire, and Guillon Links, Maughan. South Queensferry, Mr Neill. Links near St Germins, Mr D. Steuart. July. (\text Nab.)

Brook-seed or Water Pimpernel. Stems 6–10 inches high, erect, round, slightly branched towards the summit. Leaves alternate, glabrous, entire, ovate, subpetiolate. Racemes erect. Pedicels bent upwards at an obtuse angle from the bractea. Flowers very small, white; the limb patent, cleft into 5 round segments, with a small scale between each. Calyx campanulate. Capsule 5-valved, dehiscent at the apex.

25. Lonicera.


Pale Perfoliate Honeysuckle. Stems climbing, several feet high, much branched in a somewhat opposite manner. Leaves opposite, entire, smooth, glaucous beneath. Flowers yellowish; the tube reddish. Berries orange, quite smooth.


Hab. Woods and hedges, frequent. July. (\text Nab.)

Common Honeysuckle, or Woodbine. Stems several feet high, climbing, branches opposite. Leaves broadly ovate, opposite, mostly sessile, or slightly petiolate, entire, more or less hairy, rarely smooth, pale beneath. Flowers pale yellowish, or reddish. Berries red, sometimes roughish.


1. E. europaeus, “flowers often tetradrrous; peduncles compressed, many-flowered; leaves ovato-lanceolate, on short

Hab. Woods and hedges. King’s Park near St Anthony’s Well, and near Craigmillar Castle, Maughan. May, July.

Spindle-tree.—A shrub 3–5 feet high, with a smooth green bark and numerous, straight, divaricating branches. Leaves opposite, serrated, smooth. Flowers in small, axillary, pedunculate, panicled clusters, white; according to Smith, the first that open are pentandrous, and have 5 petals, the others mostly tetrandrous and with 4 petals. Petals small. Capsule 5-angled, pinkish red, 5-celled; each cell containing 1 seed.—Poisonous.

27. RIBES.


Black Currant.—About 3 or 4 feet high. Leaves large, alternate, 5-lobed, serrate, petiolate, having, as well as the whole plant, a strong peculiar smell. Pedicels rather long, with a very short bractea at their base. Berries large, black.


Hab. Woods and waste grounds. King’s Park, Mr Bainbridge. April, May, July.


28. HEDERA.


Common Ivy.—Stems very long, creeping, adhering by short and numerous root-like processes to rocks or trees; the superior branches free, much divided, and bearing a prodigious number of dark green, veined, and very shining leaves. Flower in a compact, roundish umbel, small, pale green, the petals reflexed. Pedicules downy. Stamens fully as long as the petals. Berries globular, purple-black; mealy within.

29. GLAUX.

Chenopodium. PENTANDRIA. DIGYNIA.


Black Salt-wort.—Stems procumbent or sub-erect, 2-5 inches long, slightly branched, round, very leafy. Leaves opposite, ovato-oblong, smooth, entire, succulent. Flowers pinkish, sessile, solitary, numerous. Corolla 5-lobed, obtuse.—Plant salt to the taste.

30. VINCA.

(Nat. Ord. Apocineæ, Hook. Scot. 2. p. 228.)


Hab. Woods. Auchindenny and Colinton woods, Mr Arnott. May, June. ¶.

Lesser Periwinkle.—Root creeping. Stems round, smooth, long. Leaves petiolate, shining, remaining green throughout the winter. Flowers axillary, solitary, pedunculate, erect, violet.


Hab. Woods. Dundas Hill, Mr Neill. Colinton woods, Maughan. May. ¶.

Greater Periwinkle.—Larger than the last in all its parts. Stems sub-erect, afterwards taking root at the extremities. Leaves broad, very shining, minutely scabrous at the margin. Flowers purple, similar to the preceding, but twice the size.

II. DIGYNIA.

31. CHENOPODIUM.

(Nat. Ord. Chenopodeæ, Hook. Scot. 2. p. 207.)

* Leaves semicylindrical, fleshy.


Hab. Sea-shore. Inverkeithing, Mr Neill. Aberlady Bay, Mr Arnott. August, September. ¶.

Sea-side Goosefoot.—Stem 9-18 inches high, erect, much branched, roundish, and very leafy, Leaves fleshy, smooth, nearly an inch long. Flowers in small axillary clusters, greenish, accompanied by a pair of bracteas. Stamina shorter than the petals.

** Leaves plane, undivided, entire.

PENTANDRIA. DIGYNIA. CHENOPODIUM.

Har. Waste places, especially near the sea. Fisherrow Links and Racecourse, Musselburgh, Maughan. August. 

Stinking Goosefoot.—Stems diffuse, more or less decumbent at the base, 9-12 inches long, branched and spreading. Leaves small, covered with a greasy pulvululent or mealy substance, which stinks most abominably on being touched; alternate, petiolate, dull glaucous green. Flowers forming axillary or terminal, obtusely spiked clusters. Seeds dotted.

*** Leaves plane, toothed, or lobed.


Perennial Goosefoot, or Good King Henry.—Stem a foot high or more, stout, somewhat crooked, erect, striated, branched at the base. Leaves large, very numerous, dark green, varying somewhat in form, but more or less hasteate or sagittate. Spikes of flowers pedunculate, crowded, terminal, or axillary; the uppermost ones forming a dense pyramidal generally leafless spike. Styles 2-3. Leaves used in the same manner as spinach.


Har. Rubbish and waste places near towns. August. 

Upright Goosefoot.—Stem 1-2 feet high, erect, angular, mostly simple or slightly branched. Leaves broad, irregularly and deeply toothed, usually of a paler green than the following. Flowers in terminal and axillary spikes, which are mostly simple, and in the course of flowering elongate, and become long racemes, erect, and leafless, except at the base. Seeds five times as large as in the following; being as big as rape-seed, according to Curtis and Smith.


Har. Rubbish and waste places, very frequent. Restalrig, Mr Neill. August, September. 

Red Goosefoot.—Stem erect, 1-2 feet high, stout, branched, reddish. Leaves not so broad at the base as the preceding, and somewhat attenuate, dark green. Flowers in very compound spikes or racemes, intermixed with small leaves. Seeds so minute as to be compared by Curtis to grains of sand.


PENTANDRIA. DIGYinia.

Maple-leaved Goosefoot. Stems slender, erect, branched. Leaves bright green, large and spreading, with prominent patent angles towards the base, which is not lengthened out. Panicle slender, terminal and axillary. Smell rather fetid.


Hab. Waste places, dunhills, c., common. July, August. Ø.

White Goosefoot.—Stems erect, much branched, angular, sometimes streaked with red. Leaves on rather long foot-stalks, covered with a mealy substance. Clusters of flowers obtuse, erect, with small leaves between the clusters. Seeds very smooth. When the plant is greener, the leaves more entire, and the clusters of flowers more elongated, it becomes the Ch. viride of Linnaeus.

32. BETA.


Hab. Sea-coast in muddy places. Opposite Gosford Gate, Mr Neill. Sea-shore near Kirkcaldy, Messrs Maughan and Sommerville. Near Cramond, Dr Willis. August. Ø.

Sea-side Beet.—Root perennial, thick, fleshy. Stems several, branched, tall, angular. Leaves ovate, smooth; radical ones large, spreading, succulent, petiolate; cauline ones sub sessile, alternate, undulate. Spike long, compound, erect, terminal; the lower branches axillary; a small leaf is at the base of each little cluster of flowers.

33. SALSOLA.


Hab. Sandy sea-shores, frequent. Inchcolm, Mr Neill. About Musselburgh. July. Ø.

Prickly Saltwort.—Stems much branched, rigid, angled, hairy. Leaves alternate, grooved, patent, fleshy, very spinous. Flowers solitary, axillary, sessile, with three leaf-like bracteae at the base of each. Fruit inclosed by the perianth; the cotyledons large, and forming a curious and obvious spiral.

34. ULMUS.
(Nat. Ord. Ulmaceae, Hook. Scot. 2. p. 201.)


Hab. Woods and hedges, common. Hedges and plantations about Edinburgh, Lightfoot. April. Ø.
PENTANDRIA. DIGNYIA. GENTIANA.

Common Elm.—A large tree with rugged bark and crooked trunk. Leaves rhomboid-ovate, alternate, shortly petiolate, rough on both sides, 2-3 inches long. Flowers almost sessile, arising from distinct buds, in little dense clusters, each furnished with a small ciliated bractea. Segments of the single perianth 4, very obtuse, spreading, reddish. Anthers purple.

2. U. montana, "leaves doubly serrate, pointed, rough, unequal at the base; flowers on short stalks, 5 or 6-cleft, with 5 or 6 stamens; fruit roundish, naked;" (Sm.) Hook, Fl. Scot. p. 85. Smith, Fl. Brit. 282. E. B. t. 1887.


Broad-leaved or Wych Elm.—A large tree with spreading branches, which are often even curved or pendulous, especially when young. Leaves large, rhomboid-ovate, acuminate, 2-4 inches long. Flowers in less dense clusters than the preceding, and on longish peduncles. Single perianth, 4 or 6-cleft, the segments ovato-elliptical, reddish. Anthers purple, 4-6.

35. CUSCUTA:


Hab. Parasitic on flax, nettles, and other plants, rare. On flax in a field near Musselburgh, Mr. Neill. August, September. ©.

Greater Dodder.—Roots quickly dying, as soon as the stems have attached themselves to other plants. Stems filiform, climbing, reddish, smooth, deriving nourishment from the herbaceous stems of plants, round which they entwine themselves, by means of small radicular tubercles. Leaves none. Flowers pale pinkish, in sessile clusters. Calyx ventricose, campanulate, 5-cleft. Corolla, cleft into 4 or 5 patent segments.

36. GENTIANA.


Autumnal Gentian.—Stem 6-10 inches high, erect, quadrangular, purplish-green. Leaves opposite, ovate-lanceolate, mostly 3-nerved, dark green. Flowers pale purple, axillary from nearly the very base, and terminal, pedunculate; the peduncles often forked. Tube of the corolla twice as long as the calyx.


Hab. Pastures, frequent. Hills between Pettycur and Burntisland; and King's Park, Maughan. Pentland Hills, Mr. Arnott. September, October. ©.
Hydrocotyle. Pentandria. Digynia. 61

Field Gentian.—Stems square, 3-8 inches high, often branched from the base. Leaves much the same as last. Flowers on longer peduncles than in the preceding, and the peduncles themselves more branched. In general habit the plant is very similar to the last, but is well marked by the specific character.—All the gentians are bitter.

Umbellate plants; flowers superior, of 5 petals, 2-seeded.
A. Umbels irregular. Flowers forming roundish heads.

37. Eryngium.
(Nat. Ord. Umbelliferae, Hook. Scot. 2. p. 250.)


Sea-side Eryngo.—Root creeping. Stem about a foot high, round, stiff, leafy. Leaves smooth, glaucous, variegated with whitish veins, lobed, deeply and widely dentate; teeth spinous and rigid; radical leaves petiolate. Flowers blue, densely capitate, intermixed with chaffy scales. Involute immediately under the flowers, similar to the leaves.—The whole plant is remarkably glaucous, and rigid.

38. Hydrocotyle.
(Nat. Ord. Umbelliferae, Hook. Scot. 2. p. 250.)


Marsh Penny-wort. White-rot.—Stems very creeping, filiform, radiating at each joint, and producing from the same point a tuft of leaves and flowers. Leaves bright green, shining, smooth, horizontal, petiolate; the petiols slender, 2-4 long, simple from the base. Flowers on simple peduncles, scarcely an inch long, and therefore easily overlooked; whitish or reddish, with 2 minute bracteas at their base. Petals broadly lanceolate. Fruit orbicular, striated.

39. Sanicula.
(Nat. Ord. Umbelliferae, Hook. Scot. 2. p. 251.)


Wood Sanicle.—Stem 9-18 inches high, erect, rather branched, somewhat spreading, smooth, channelled. Leaves almost all radical, petiolate, shining, paler beneath, very smooth, deeply 5-7-lobed; lobes mostly trifid, or irregularly cut, finely serrate, and slightly ciliate. General Umbel unequal, as well as the partial one. General involucre of 2 foliaceous pinna- tifid leaves; Partial one, of several lanceolate leaves. Heads of flowers whitish. Fruit ovate, rough, with erect scale-like hooked processes.
B. Umbels regular.


HAB. Rocks by the sea-side. Said to grow on the Islands in the Frith of Forth, but not now to be found. August. ½.

*Samphire.*—Stems 6-12 inches high, suberect, round, leafy. Leaves bi- or tri-ternate; the leaflets entire, linear-lanceolate, smooth, glaucous. Umbels rather crowded; the rays short. General and partial involucres of small ovate-lanceolate leaves; the former mostly of 5, the latter of 7. Petals entire, broad at the base, inflexed, yellowish or greenish white. Fruit oval, spongy.—Whole plant very succulent and fleshy. Used to make pickle.

41. *CENANTHE.*


HAB. Ditches and stream-sides, rare. Between Inverkeithing and North Queensferry, Lightfoot. July, August. ½.

*Common Water-Dropwort.*—Stems erect, 2-3 feet high, smooth, hollow as if inflated, glaucous, branched. Leaves; radical ones, bi-pinnate, the leaflets plane, often lobed; cauline ones, alternate, pinnate; the pinnæ confined to the extremity. Umbels alternate, towards the summit, on long peduncles; primary rays 3-5. General involucre often wanting; often 1-leaved; the partial one of several lanceolate leaflets. Flowers pinkish white. Petals obcordate, radiating. Calycine segments very acute. Fruit ovate-truncate.


*Hemlock Water-Dropwort.*—Stems erect, 3-5 feet high, branched, furrowed, leafy. Leaves bi-pinnate, deep green, upper ones sessile; leaflets mostly all alike, opposite, sessile, smooth, veined. Umbels terminal, large, many-rayed, many-flowered. General and partial involucre, many-leaved, liable to vary in form. Flowers white, obcordate, slightly radiating. Fruit oblong, ribbed.—Whole plant very poisonous.

42. *SISON.*

(Nat. Ord. Umbelliferæ, Hook. Scot. 2. p. 252.)

1. *S. inundatum*, stem creeping; lower leaves capillary, multifid; umbels mostly of two rays, and wanting a general invo-


*Water Honewort.*—Stem creeping, floating, 6-18 inches long, according to the depth of the water, round, weak, branched. *Leaves petiolate; the lower ones, capillaceo multifid; those near the surface, and above the water, pinnate, with rather broad and cut or lobed leaflets. Peduncles of the 2-rayed umbels axillary. Smaller umbels minute, about 5-flowered. Partial involucre mostly 4-leaved. Flowers white, the petals entire, acute, nearly equal. Fruit ovate, somewhat truncate, striated.*

43. **Bunium.**

(Nat. Ord. Umbelliferae, Hook. Scot. 2. p. 251.)


Hab. Pastures and woods, abundant. June, July.  

*Common Earth-nut.*—Root, a roundish tuber 2-4 inches beneath the soil. Stem white and flexuose beneath the surface of the ground, about a foot high, erect, slightly branched, striated, smooth. *Leaves; radical ones petiolate; cauline ones nearly sessile, with a short sheath. Umbels terminal, many-rayed. Umbellules rather dense. Flowers white, the petals obcordate. General involucre 1-3 leaved, rarely wanting; partial one many-leaved. Fruit ovate.—The tuberous root is edible.*

44. **Conium.**

(Nat. Ord. Umbelliferae, Hook. Scot. 2. p. 251.)


Hab. Hedges, waste places, and road-sides, very common about Edinburgh, in every direction. June, July.  

*Common Hemlock.*—Stem erect, 2-5 feet high, much branched, polished, spotted with purple. *Leaves large, spreading, much divided in a pinnate manner, narrow, deep shining green, and sharply serrate, the ultimate leaflets varying from serrate to nearly entire. Umbels and umbellules many-rayed. General involucre of several short ovate-lanceolate leaves; partial ones few-leaved, setaceous, and directed to one side. Flowers white, numerous; the petals subequal, inflexed, cordate. Fruit ovate, furrowed, the ribs crenulate.—Whole plant highly poisonous. Medicinal. Fœtid when bruised.*

45. **Thysselinum.**

(Nat. Ord. Umbelliferae, Hook. Scot. 2. p. 251. (Selinum.)

64 PENTANDRIA. DIGYNIA. LIGUSTICUM.


Marsh Milky Parsley.—Stem solitary, erect, roundish, angular, branched upwards, 3-5 feet high. Leaves rather large, glabrous, petiolate, remote, few. Umbels terminal, erect, nearly plane, white, large, many-rayed. Involucres; gen. of many lanceolate deflexed leaves: partial ones of many smaller leaves. Petals small, white, equal, inflexed. Fruit oval, with 3 approximate obtusely raised ribs.—Plant with a milky juice, which is bitter and fetid.

46. LIGUSTICUM.
(Nat. Ord. Umbellifere, Hook. Scot. 2. p. 252.)


Scottish Lovage.—Stems erect, somewhat branched, 12-18 inches high, rather robust, reddish, smooth, striated. Leaves towards the base bi-ternate; the upper ones ternate and nearly sessile; all shining green, and somewhat fleshy; leaflets serrated and cut. Main Petioi winged and dilated at the base. Umbels many-rayed, large, erect, terminal. Flowers white, small, equal; the petals inflexed. Fruit oblong, ribbed; the ribs winged, membranaceous.—Plant aromatic. Eaten raw in Skye.

47. ANGELICA.
(Nat. Ord. Umbellifere, Hook. Scot. 2. p. 252.)


Wild Angelica.—Stem erect, 2-4 feet high, branched, smooth, purplish, covered upwards with a fine glaucous pubescence. Leaves widely spreading, slightly glaucous. Umbels large, convex, many-rayed, rather crowded. General involucere about 2-leaved, linear, rarely wanting; partial one many-leaved, setaceous. Flowers pinkish-white; the petals equal, ovate. Fruit small, roundish, with 3 winged ribs.

48. SIUM.
(Nat. Ord. Umbellifere, Hook. Scot. 2. p. 252.)


Hab. Ditches and pond-sides, not frequent. Duddingston Loch, Mr Yalden in Lightfoot. August. 4.

Broad-leaved Water Parsnip.—Root creeping. Stems erect, smooth, angular, 3-5 feet high. Leaves; the lower ones, especially if immersed, are
bi-pinnate, and the leaflets cut; the upper ones pinnate, the pinnae 7-9 pair, sessile, ovate-lanceolate, smooth. Umbels large, many-rayed, flat-tish. General involucre many-leaved, lanceolate, sometimes serrate; partial ones, of several leaves, ovate. Flowers white, the petals nearly equal, obcordate, inflexed. Fruit small, shortly ovate, somewhat truncate, striated. —Plant acid.


Narrow-leaved Water-Parsnip.—Root creeping. Stems erect, branched, striated, but not channelled. Leaves pinnate; leaflets 8-10 pair, sessile, ovate, unequally serrate, inciso-lobate, the lowest pair remote from the rest. Umbels lateral and terminal; rays many, much shorter than in the preceding. General involucre of many deflexed, lanceolate, and often subpinnatifid leaves; partial ones of small, ovate, mostly entire leaves. Flowers whitish; the petals equal, obcordate, inflexed. Fruit ovate, small, ribbed.


Hab. Rivulets, pond-sides, and ditches. Hope Park, Mr Neill. July. %.

Procumbent Water-Parsnip.—Root creeping. Stems procumbent, branched, 1-2 feet high, sometimes floating, rarely creeping. Leaves glabrous; the leaflets sessile, 3 or 4 pair, subequally serrate, the odd terminal one largest. Umbels small, of more rays than the following, subsessile. General involucre of one leaf, or wanting: partial ones ovate, as long as the pedicels of the flowers. Petals white, ovate, scarcely inflexed. Fruit ovate.


Hab. Ditches and sides of streams, rare. Near Edinburgh, Mr Mackay. Banks of a pond at Fisherrow, and at Guillon Links, Dr Hope. July, August. %.

Creeping Water-Parsnip.—Stems prostrate, striated, 6-10 inches in length, slender. Leaves pinnate; leaflets 2-5 pair, very irregularly serrate, or rather toothed, the terminating one the broadest. Umbels 3-6 rayed: umbellules very short, few, dense. General and partial involucres of several small, ovate-lanceolate, spreading leaves. Flowers white, petals nearly equal, inflexed. Fruit roundish, compressed.

49. HERACLEUM.

(Nat. Ord. Umbelliferae, Hook. Scot. 2. p. 252.)

PENTANDRIA. DIGYNIA. PHELLANDRIUM.


Common Cow-Parsnip.—Stems 4–5 feet high, strong, robust, erect, furrowed, angular, rough. Leaves very large, scabrous, hairy, ternate or pinnatifid, variously cut, lobed and serrate. Sheathing base of the petiols, large, ventricose, ribbed, and hairy. Umbels very large, nearly plane, of many strong rays. General and partial involucres of several lanceolate leaves, which soon fall off. Flowers white or reddish; petals radiating, unequal, irregularly obcordate. Fruit large, broad, flat, smoothish, 3-ribbed on each side.—A coarse, rank plant.

** Umbels with partial involucres only.

50. PHELLANDRIUM *.


Water Hemlock.—Stem round, furrowed, erect, 2–3 feet high, thick at the base, branched in a bushy manner. Leaves spreading, smooth, dark shining green, the last divisions rather pinnatifid than pinnate. Umbels many-rayed, axillary or opposite to the leaves, rather small. Partial involucres of many lanceolate small leaves. Flowers white, not sessile; petals equal, broadly obcordate. Calyx 5-leaved, distinct. Fruit ovate, a little compressed, smooth, ribbed.

51. ÆTHUSA.

1. Æ. Cynapium.


Fool’s Parsley.—Stem branched, erect, about a foot high, smooth, striated, often purplish, but not spotted. Leaves bi-pinnate, smooth, dark green, segments ovate-lanceolate, variously cut, lobed, and more or less decurrent; the lowest leaves are sometimes tri-pinnate. Umbels terminal, on longish peduncles, many-rayed, not dense. Umbellules small. Flowers white; petals somewhat radiating, obcordate. Partial involucres of 3 long, linear, pendant leaves on one side. Fruit ovate, striated.—Said to be poisonous. Smell nauseous, very different from that of Garden Parsley, which it somewhat resembles.

52. CICUTA.

1. C. virosa, lower leaves tripinnate, leaflets sub-ternate, ser-

* This genus has been united to Ænanthe by some late authors, as Lamarke, De Candolle, and Schultes. It differs, however, in too many respects to remain in such a situation. There is no general involucre; all the florets are fertile, and not radiate; the fruit also differs, especially in the arrangement of the vitta.
53. IMPERATORIA.


Mastervort.—Root tuberous. Stem erect, 1-2 feet high, slightly branched or simple, striated, smooth. Leaves bi-ternate, smooth; leaflets broad, sharply and unequally serrate, and often 2-lobed at the base. Umbels many-rayed, flatish, large, terminal, very few. Partial involucres of several sessate leaves. Flowers white or pinkish, numerous, petals equal, obcordate, reflexed; stamens long. Fruit smooth, ribbed, with a broad dilated border.—English name from its supposed wonderful virtues in healing numberless diseases and disasters.

54. MYRRHIS.


Hab. Waste places. Foot of the Castle bank, to the north-east, Mr Neill. Arniston woods, Mr Arnott. Under the wall of Caroline Park, close to the sea. May. 1/2.

Sweet Cicely. Great Chervil.—Stems about 2 feet high, firm, branched, furrowed. Leaves hoary with pubescence, pale green, sessile, tri-pinnate; leaflets ovate-lanceolate, serrate. Umbels erect, terminal, many-rayed. Partial involucres of 5 lanceolate, pale, somewhat deflexed leaves, with ciliate margins. Flowers white, rather crowded; petals rather equal, confluent. Fruit large, 1/3 of an inch in length, linear-oblong, with prominent somewhat winged ribs.—Herb very aromatic.

2. M. aurea, stems slightly swelling below the joints, pubescent and roughish with deflexed hairs; leaves tri-pinnate, segments of the upper ones very acute; fruit ribbed, tawny. Roem. et Sch. Syst. v. 6. p. 511. Charophyllum aureum,
55. CHÆROPHYLLUM.


**Umbels having neither general nor partial involucres. (Carrum has a general one, and Apium Petroselinum both.)

56. APIUM.


PENTANDRIA. DIGYNIA.

Har. Marshes and stream-sides near the sea. Ditches behind Musselburgh, Dr Parsons in Lightfoot. August. ♀.

Smallage. Wild Celery.—Stems branched, erect and spreading, 1-2 feet high, smooth, furrowed, pale yellowish green. Leaves shining; radical ones on long petioils, pinnate, leaflets broad; cauline ones ternate, nearly sessile. Umbels lateral and terminal, often almost sessile, many-rayed; umbellules very small. Flowers white, small; petals equal. Fruit roundish, ribbed.—Acrid and poisonous. When cultivated it becomes the innocent celery of our gardens.


Har. Waste places and fields. Old walls at Inverleith; on an old wall at Colinton and Dreghorn, Maughan. Waste places around Edinburgh, but in no fixed station. July. ♀.

Common Parsley.—Stem erect, 12-18 inches high, smooth, somewhat angular, firm, branched. Leaves shining; radical ones on long channelled petioils, tri-ternate, leaflets broad, lobed, cut. Umbels many-rayed, mostly pedunculate. There is a general involucre of usually 1 leaf, and partial ones of several small, filiform leaves. Flowers small, yellowish; petals equal. Fruit roundish, ventricose, smooth, ribbed.—There are several varieties which occur in gardens, especially one with broad crisped leaves. It is certainly so completely naturalised as to deserve a place in the British flora.

57. CARUM.


1. C. Carui.


Har. Waste places. Rocks on the west side of the Castle, Dr Parsons in Lightfoot. Between Newhall and South Queensferry, and near the village of Abercorn, Messrs Maughan and Shuter. June. ♀.

Common Caraway.—Stem 1-2 feet high, branched, furrowed, glabrous. Leaves bl-pinnate, smooth, the lower ones decussate; segments narrow, linear. Umbels numerous, erect, terminal, many-rayed, and furnished with a 1-3-leaved general involucre. Flowers white or pinkish; petals equal, small, inflexed. Fruit small, ovate-elliptic, marked with three lines in the valleculae or spaces between the ribs.—Seeds highly aromatic.

58. PIMPINELLA.


* This plant is an exception to the genus, in as far as it possesses a general monophyllous involucre, and partial ones of several filiform leaves; and in the valleculæ of the seeds, having several vitre in the place of a single one. It forms the genus Petroselinum of Hoffman, worthy perhaps of being retained.
PENTANDRIA. DIGYNIA. Smyrnium.


Common Burnet Saxifrage.—Roots strong and woody. Stem 12-18 inches high, erect, round, roughish, firm, slightly branched upwards. Leaves; radical ones pinnate; cauline ones bi-pinnate. Umbels drooping when young, on long peduncles, many-rayed, terminal, flattish. Flowers white, small, nearly equal; stamens long. Fruit small, ovate, ribbed. The variety which occurs with dissected leaves, has been found by Dr Graham on Arthur's Seat. Root very aromatic.

59. ÅEGOPODIUM.

1. Æ. Podagraria *.

Hab. Woods, hedges, and waste places, in moist situations, common. Right-hand side of, and within the gate of the entrance to Braid Hermitage. June. 2.

Gout-weed.—Root creeping. Stems erect, 1-3 feet high; furrowed, slightly branched. Leaves; radical ones on long petiois, bi-ternate; cauline ones ternate; leaflets large, ovate, unequally serrate, smooth, nearly equal. Umbels erect, terminal, many-rayed, flattish. No general or partial involucre. Flowers white; petals unequal, ob-cordate. Fruit sub-compressed, ovate-elliptical, each seed 3-ribbed.

60. SMYRNium.


Hab. Waste places near the coast. Sea-shore below the old Castle of Ravensheugh, between Dysart and Kirkcaldy, Dr Walker. By the side of a rivulet at Kinghorn; and Dirleton Castle, Maughan. Very abundant still in both the first mentioned stations. May, June. 3.

Alexanders.—Stems erect, 3-4 feet high, stout, furrowed, pale yellow green. Leaves broad, shining; rather succulent; radical ones large, tri-ternate, on long petiois; cauline ones shortly petiolate, the sheaths somewhat lacerate and fringed at the edges. Umbels erect, large, globose, terminal, many-rayed, strong, stoutly pedunculate. Flowers small, numerous, green-yellow; petals nearly equal, infllexed. Fruit nearly black, large, roundish, swelling, with acute prominent ribs. Whole plant of a pale shining yellowish-green colour, smooth, and rather fleshy. Highly aromatic, but bitter; once used as a pot-herb.

b. Fruit hairy or bristly.

* Umbels with a general and partial involucre.

61. TORILIS.
(Nat. Ord. Umbelliferae, Hook. Scot. (Caucalis) 2. p. 251.)

1. T. Anthriscus, scabrous; stem and branches erect; leaves

* This genus is united to Siam by Sprengel; but it differs from it in important characters, besides being destitute of general and partial involucres.
Daucus. PENTANDRIA. DIGYNA. 71


HAB. Hedges and waste places, common. July, August. ○.

Upright Hedge-Parsley.—Stem 2-3 feet high, erect, branched, firm, very rough with deflexed hairs. Leaves bi-pinnate, on channelled petiols; the pinnae opposite; leaflets deeply serrate, scabrous. Umbels terminal, erect, the rays scabrous; umbellules dense, flat. General and partial involucres of several small subulate leaves. Flowers mostly reddish, sometimes white, small; petals unequal, ob-cordate. Fruit small, ovate, very rough and bristly, tinged with purple.


HAB. Waste places, road-sides. Bank below Salisbury Craigs towards Duddingston Loch, and by the road-side leading from Drummore to Preston, Maughan. It grows immediately under the basaltic columns, on the path-side to Duddingston, and at the foot of the wall which supports the path. June. ○

Knotted Hedge-Parsley.—Stem mostly prostrate, yet sometimes erect, 8-16 inches long, rather slender, somewhat rigid, branched. Leaves bi-pinnate, dull green, leaflets narrow, lobed and cut; the two lower pinnae remote from the rest. Umbels in the form of dense, lateral, sub-sessile heads or clusters, opposite to the leaves, the very short peduncle being partly embraced by the sheath of the petiol. Involucres subulate, many-leaved, hairy. Flowers minute, equal, reddish. Fruit ovate, thick, the outer very rough and bristly, the inner warty.

62. DAUCUS.

(Nat. Ord. Umbelliferæ, Hook. Scot. 2. p. 251.)


Wild Carrot.—Root fusiform, aromatic. Stem 12-18 inches high, erect, furrowed, branched and hispid. Leaves; tri- or bi- pinnate, dark green, hairy, especially beneath. Umbels many-rayed, erect, flat when in flower; afterwards the external and longer rays become contracted and incurved, which renders the surface of the umbel concave like a bird's nest. General involucres deeply pinnatifid, linear; partial ones often 3-cleft. Flowers white or reddish; petals unequal, radiate, obcordate. Fruit very rough, with rigid bristles.—Whole plant aromatic. Origin of the garden carrot.

** Umbels with partial involucres only.

63. ANTHRISCUS.


1. A. vulgaris, stem smooth; leaves tri-pinnate, leaflets ob-
PENTANDRIA. TRIGYNIA. VIBURNUM.


Hab. Road-sides and waste places, abundant. May, June. ○

Common Anthriscus.—Stems about 2 feet high, rather weak, much spreading and branched, glabrous, striated, swelling beneath each joint. Leaves petiolate, pale delicate green, slightly hairy. Umbels mostly lateral, opposite the leaves, on peduncles of various lengths, sometimes almost sessile, 4-6 rayed; umbellules small, few-flowered. General involucre wanting, or very rarely of one leaf; partial ones of several small ovate leaves. Flowers white, small; petals nearly equal, ob-cordate. Fruit rough with hooked bristles, ovate-lanceolate, including the glabrous bifid beak, which is about half its length.—Whole plant of a pale green, and weak delicate habit.

64. SCANDIX.


Needle-Chervil. Venus's Comb.—Stems spreading, branched, furrowed, rough. Leaves very much divided, and regularly linear, smooth, dark green. Umbels irregular, sometimes simple, but mostly of 2 or 3 rays; the umbellules of several short ones. Partial involucres of several leaves, more or less divided towards the apex. Flowers small, white; petals unequal. Fruit oblong, rough, furnished with an angular, scabrous beak, an inch and a half long.

III. TRIGYNIA.

65. VIBURNUM.


Common Guelder-Rose or Water Elder.—Small tree, having many stems from the same root, and spreading upwards. Branches opposite. Leaves large, broad, very glabrous, 3-lobed, unequally serrate, rather paler beneath, fine red in decay. Cymes terminal, erect, large, flat, with white flowers of two sizes, the inner ones small, equal, fertile; the outer very large, unequal, radiating, 5-cleft, containing neither stamens nor pistils. Berries drooping, very succulent, pinkish red, with an unpleasant smell when bruised. Seeds compressed.

66. SAMBUS.

1. S. Ebulus, cymes with three principal branches; leaves
Parnassia. Pentandria. Tetracygynia. 73


Hab. Woods and waste places, rare. In a field by the road leading from Edinburgh to Dalkeith, a little beyond Newington, Mr J. Mackay. South bank of the Water of Leith, Maughian. Near Inverkeithing, Mr J. Stewart. July. 2.

Dwarf Elder.—Root creeping. Stems about 3 feet high, erect, simple, furrowed, rough. Leaves with 3-4 pair of leaflets, dark green, smoothish, serrate, veiny. Cymes large, terminal, dense, the branches pilose. Flowers numerous, pedicellate, purplish; corolla-segments ovate. Stamens thick, erect. Berries globular, purple black.—Plant feticid; cathartic.


Common Elder.—A small bushy tree, with opposite branches filled with a light white pith. Leaves dull green, with 2-3 pair of leaflets; leaflets serrate, in one variety laciniate (Parsley-leaved Elder), smooth. Cymes terminal, large, flat, cream-coloured. Flowers numerous, strong-scented; corolla-segments roundish. Stamens spreading. Berries purple black, in one variety white.—Plant feticid. Berries in request for making wine. Pith very useful in various electrical experiments.

IV. Tetracygynia.

67. Parnassia.


1. *P. palustris*.


Hab. Bogs and marshy pastures, rare in this neighbourhood. Pentland Hills, abundant near the Water-house, and near Swanston Wood, Mr Neill. King’s Park, Mr Bainbridge.

Grass of Parnassus.—Stem 6-12 inches high, erect, glabrous, and somewhat twisted, angular, 1-flowered, and bearing a single, sessile, cordate, entire leaf below the middle; radical leaves numerous, on long petiols, in other respects similar to the cauline one. Corolla inferior, white, large; petals broadly ovate, finely veined. Nectaries beautiful, in the form of scales, fringed with filaments tipped with yellow pellucid globules, and alternating with the stamens. Capsule ovate, stigma sessile.

V. Pentagynia.

68. Statice.


1. *S. Armeria*, leaves linear; scape simple, bearing a round

Hab. Sea-coast and on mountains. Summit of Arthur's Seat, Mr D. Steuart. Frequent on both sides of the Frith of Forth, and in the Islands. July, August. 

Thrft.—Plant growing in thick tufts. Leaves all radical, very numerous, channelled, glabrous, short and linear. Scapes, 3-8 inches high, rather slender, but firm, sheathed at their apex by a ragged reddish membrane, near an inch long, united above to the brown, acute, 3-leaved general involucre; inner involucre obtuse, scariose. Flowers rose-colour; petals obovate.

69. LINUM.

(Nat. Ord. Lineæ, Hook. Scot. 2. p. 277.)


Common Flax.—Stem 12-20 inches high, erect, round, smooth, simple at the base, branched above in a panicled manner; branches erect, slender. Leaves distant, glabrous, 3-nerve, entire. Flowers, pedunculate, erect, large, blue; petals broadly ovate, fixed by a claw. Capsule roundish, pointed. Seeds elliptical, highly polished.—Cultivated for the manufacture of flax from the stems. Seeds produce the linseed-oil.


Purging Flax.—Stems very slender, erect or spreading, 2-6 inches long, several arising from the same base, then simple till near the top, when it becomes branched in a dichotomous manner. Leaves opposite, thus differing from the other British species. Flowers white, small, drooping before expansion.

VI. HEXAGYNIA.

70. DROSEA.


Round-leaved Sun-den.—Leaves naked beneath, covered above, and on the margin with crimson hairs, tipped with a very glutinous pellucid globe. Scapes several, 3-6 inches high, slender, firm, smooth. Raceme terminal, subsecund, somewhat curved. Flowers small, whitish, shortly pedicillate, erect. Petals obovate.
VI. HEXANDRIA.

I. MONOGYNIA.

1. GALANTHUS.


1. G. nivalis.


Snowdrop.—Root bulbous. Scape 4–8 inches high, round, smooth, 1-flowered. Leaves 2, broadly linear, obtuse, glaucous green, sheathing the stem at the base. Flower drooping, large, pedunculate, bursting from a spatha; inner segments of the perianth striated with green.

2. NARCISSUS.

(Nat. Ord. Amaryllideæ, Hook. Scot. 2. p. 185.)


Hab. Damp woods and moist places, rare. Meadows in the neighbourhood of Culross, Maughan. April 7.

Common Daffodil.—Root a roundish bulb. Scape 8–10 inches high, compressed, 2-edged, 1-flowered. Leaves long, broadly linear, obtusely keeled. Flower drooping, large, pale yellow, bursting from a spatha. Nectary gold-colour, obsoletely 6-lobed at the margin.

3. ALLIUM.


Crow Garlic.—Root a small ovate bulb. Stem slender, erect, 12–18 inches high. Leaves few, long, round, hollow, smooth. Spatha deciduous. Umbel small, furnished with many little acute greenish bulbs, densely crowded: Flowers greenish flesh colour, small, few, on short capillary peduncles. Stamens longer than the petals, each having 3 filaments, the center one shortest, and antheriferous.—It often happens that the flowers are wanting in this species.


Streaked Field-Garlic.—Root a small ovate brown bulb. Stem near 2 feet high, erect, slender, round. Leaves long, acute, channelled above,
HEXANDRIA. MONOGYNIA. HYACINTHUS.

rounded beneath and nerved, roughish on both sides. Umbel bearing many ovate, purplish bulbs, intermixed with flowers on long slender peduncles. Petals of a greenish white, streaked with 3 purple lines. Stamens simple.


Hab. Moist woods. Rosslyn woods, Lightfoot. Auchindenny woods, Mr Neill. King's Park, Mr D. Steuart and Dr Graham. Arniston woods. June. *

Broad-leaved Garlic or Ramsons.—Root a slender bulb. Scape about a foot high, erect, weak, smooth. Leaves very smooth, all radical, shorter than the scape, acute; base of the petiol sheathing. Spatha of 2 ovate, acute leaves. Umbel many-rayed. Flowers white; petals ovate-lanceolate, spreading.—Odour, when the plant is bruised, remarkably strong. Flowers handsome.

4. ORNITHOGALUM *.

(Nat. Ord. ASPODELEAE, Hook. Scot. 2. p. 184.)


Hab. Moist woods, very rare. Auchertool Linn, Maughan. March, April. *

Yellow Star of Bethlehem.—Root a very small bulb. Stem about 6 inches high, erect. Leaves: single radical one long, broadly linear; Caulline ones 2, much shorter, unequal, situated immediately below the umbel, ciliated at the margin. Segments of the perianth ovate-lanceolate, greenish externally, yellow within.—An elegant and rare, but truly native plant.

5. HYACINTHUS.

(Nat. Ord. ASPODELEAE, Hook. Scot. 2. p. 184.)


Hab. Woods, hedge-banks, &c. Coryton woods, and on the south side of the opposite Logton wood, by Dalkeith, Lightfoot. Craigleith Quarry; and Salisbury Craigs, Mr Neill. Rosslyn woods. May. *

Wild Hyacinth or Hare-bell.—Root a roundish or ovate white bulb. Scape 9-12 inches high, round, smooth, succulent, brittle. Leaves all radical, broadly linear, somewhat keeled, flaccid, summit nodding. Raceme elegant, simple, many-flowered, gracefully curved. Flowers large, pendent, fine purple blue, sometimes white, very shortly pedicellate. Bracteas 2

* I find in a note, dated 1797, by my highly esteemed friend Mr Neill, that Ornithogalum umbellatum, was growing in a pasture of the King's Park, of very many years standing. It is, however, now eradicated, and having never been found since or in any other spot, can scarcely claim insertion.
at the base of each pedicel.—One of the most ornamental and graceful of British plants; with far more of the habit of a hyacinth than a squill.

6. NARTHECIUM.
(Nat. Ord. JUNCE., Hook. Scot. 2. p. 182.)

1. N. Ossifragum.


Lancashire Asphodel.—Root creeping. Leaves all radical, equitant, ensiform, like those of the Iris, but much smaller. Scape 6-8 inches high, decumbent at the base, much longer than the leaves, clothed at intervals with lanceolate scales. Flowers arranged in a terminal spike, bright yellow, shortly pedunculate, erect; a small reddish bractea at the base of each peduncle. Leaves of the perianth 6, linear-oblong, spreading, persistent. Capsule prismatic, pointed, brown, shining.—A handsome plant.

7. ASPARAGUS.
(Nat. Ord. ASPARAGE., Hook. Scot. 2. p. 183.)


Hab. Sandy sea-shores, rare. Links near Gosford, Mr E. Maughan. August. ☼.


8. CONVALLARIA.
(Nat. Ord. ASPARAGE., Hook. Scot. 2. p. 183.)


Lily of the Valley. Root creeping. Leaves 2, smooth, veined, terminating below in straight, equitant petiols, sheathed at their base with pale scales. Scape issuing from the sheathing scales, distinct from, but along with the leaves. Raceme few-flowered, with a lanceolate bractea at the base of each peduncle. Flowers pure white, campanulate, 6-cleft, odoriferous, subsecund; the segments recurved. Stamens inserted on the corolla. Berries red, spherical.—Universally cultivated for its elegance and delightful fragrance.

9. JUNCUS.
(Nat. Ord. JUNCE., Hook. Scot. 2. p. 179.)

* Leaves none. Flowers lateral.

1. J. glaucus, stem deeply striated, rigid; panicle much


Common Hard Rush.—Roots creeping. Stems 1-2 feet high, erect, slender, rigid, glaucous, with very acute summits; base inclosed with dark brown, shining sheaths. Panicle bursting several inches below the summit, loose, but erect. Perianth slender, pale brown; its leaves lanceolate-subulate. Stamens 6. Capsule acute, 3-sided, shining.—Sheaths at the base of the stems in the species of this division, regarded by Mr Bicheno as rudiments of leaves; and what have been usually called leaves, he therefore considers barren stems. See his excellent Monograph of the British species in Linn. Trans. v. 12. p. 296.


Hab. Wet pastures and marshy places, common. July. 2.

Soft Rush.—Root creeping. Stems 2-3 feet high, slender, pliable and soft, smooth, pale green. Panicle spreading, very much branched. Leaves of the perianth lanceolate-subulate, pale greenish. Stamens 6, rarely 3. Capsule obtuse, which is an excellent mark of distinction between this and the preceding.—Manufactured into mats, &c. Pith used in making rush-lights.


Hab. Marshy places, very abundant. July. 2.

Round-headed Rush.—Root creeping. Stems 2-3 feet high, soft, sheathing, scales at the base, very long and dark. Panicle bursting nearer the top of the stem than in either of the preceding, densely conglomerate. Stamens 3. Capsule ovate, retuse, about as long as the perianth.—Used for economical purposes like the last.

** Leaves all radical. Flowers terminal.


Moss Rush. Heath Rush.—Root fibrous. Stems about a foot high, rigid, smooth. Leaves forming a coarse dense tuft, spreading, very numerous, linear, acute. Panicle elongate, compound, furnished with lanceolate, brown sheathing bracteas. Leaves of the perianth brown, lanceolate, with scarioso margins. Capsule obovate, shining, obtuse.—A coarse species, obtaining the mastery over every other plant that grows beside it.

*** Stems Leafy.

† Leaves nearly plane; channelled above.

5. J. bulbosus, culm simple, compressed; leaves linear-se-

Hab. Marshy places, frequent. By the sea-side between Granton and Cramond. August. 4.

Round-fruited Rush.—Root creeping. Culms numerous, erect, 6-12 inches high, leafy towards the base, compressed upwards. Leaves mostly radical, long. Bracteas channelled, setaceous, the lowest usually longer than the panicle. Panicle branched, irregular, the first branch generally longer than the rest. Leaves of the perianth brown, obtuse, scariose at the margin, shorter than the obtuse roundish capsule.

Juncus crenatus, of Mr Bicheno, I believe with Dr Hooker, to be nothing more than a variety of this species. It has a nearly simple panicle, very few flowers, and the bractea short. Muddy salt marshes often abound with it, and it will probably be found to grow near Edinburgh.


Hab. Moist places; dried up ditches, &c. common. August. 3.

Toad Rush.—Root fibrous. Culms 3-9 inches high, numerous, slender, bearing a dichotomous panicle. Leaves channelled, acute, mostly radical. Bracteas at the base of the panicle long, foliaceous: small, partial, ovate, scariose bracteas or scales accompany the flowers. Leaves of the perianth pale green, with white scariose margins, linear-lanceolate, acuminate. Capsule much shorter than the perianth, elliptic-ovate, obtuse.


Hab. In marshes and places that are partly dried up in the summer. Frequent on the Pentland Hills, and in the peat-pits on Ravelrig-toll-moss, Maughan. The marshes on Braid Hill are filled with it. August. 4.

Little Bulbous Rush.—Root fibrous. Culms thickened at the base in a bulbous manner, 3-18 inches long, according to situation; sometimes erect, but more commonly ascending or prostrate, and striking roots at the joints; branched, slender, often filiform. Flowers sessile, 2-5 together; clusters rather distant, sometimes forming a sort of terminal panicle, at others ranged irregularly along the prostrate culm, and giving origin at the same point to roots and leaves. Bracteas small and scariose, shorter than the flowers, and not changing into leaves in the viviparous variety, as Mr Bicheno has mentioned: at least in my specimens, the bracteas remain, and the new leaves arise from the stem. Leaves of the perianth acuminate, scariose at the margin, chocolate-coloured, keeled. Capsule obtuse, 3-sided, longer than the perianth in dry situations, often shorter, in the prostrate variety.

This is a most provoking species to the botanist, for he no sooner lays down a character which he hopes may prove constant, than he finds it perhaps contradicted by the next specimen which he examines. I am by no means satisfied with the character I have given, but have no better to offer. The only part of Mr Bicheno's which can be relied on, is the "leaves setaceous, grooved." The flowers are by no means constant to 3, nor
are they always sessile, some of my specimens having peduncles as long as the capsule. The length of the perianth varies in its relation to the capsule, and the bulbous base of the stem is sometimes scarcely to be traced in the long proliferous variety, which, after all, is the most common.

†† Leaves rounded, apparently jointed; (having numerous internal transverse partitions.)


**Hab.** Ditches and marshy places, very common. July, August. ♂.

**Sharp-flowered Rush.**—Root creeping. **Culm** 1–2 feet high, erect, weak, compressed. **Leaves** 3–4 on the culm, sheathing. **Panicle** in flower and fruit much branched, lax, divaricate; the branches rather long, slender, the extreme ones sometimes patent, and even reflexed. **Leaves of the perianth** all similar, lanceolate-subulate, green or chocolate coloured, obsolesently keeled. **Capsule** 3-sided, elliptic-ovate, acute light brown, about as long as the perianth.

This plant varies considerably in the character of its panicle. The little clusters are 3–15-flowered, and as the clusters are tolerably uniform on the same specimen, the appearance of others is very different. Fruit is not so freely produced as in the next species, and is seldom longer than the perianth, and never so dark coloured or so highly varnished.


**Shining-fruited Rush.**—Root creeping. **Culms** ascending or erect, 3–12 inches high, compressed, many-leaved, not weak like the last. **Leaves** compressed, rather short, acute. **Panicle** terminal, erect, compound, but with few branches, and those rigid. **Clusters of flowers** larger and fewer than in the preceding. **Leaves of the perianth** oblong-lanceolate, with a short point passing beyond the scariose margin, not subulate at the apex like those of the last; the inner leaves somewhat more scariose than the outer, but I agree with Dr Hooker, that there is no difference in form as Mr Bicheno thinks. **Capsules** very large, acutely triquetrous, purplish black, tipped with the acute persistent style, considerably longer than the perianth, and very highly varnished, giving the panicle a blackish appearance even at a distance. Two or three weeks earlier in producing fruit than the preceding. In both species the flowers are accompanied by scariose scale-like bracteas, tipped with a delicate mucro.


**Hab.** Bogs and ditches, rare. Ditches in Abercorn Park near the lower fish-pond, abundant. August. ♂.
Luzula. HEXANDRIA. MONOGYNIA. 81

Blunt-flowered Rush.—Root creeping. Culms erect, 2–3 feet high, smooth, cylindrical, weak, few-leaved. Leaves long, jointed, almost knotty when dry. Panicle very compound, several sets of branches arising from different points, which are consequently crowded with scarlose bracteas; extreme branches often reflexed. Flowers 2–5 in a cluster, sessile, pale green. Perianth-leaves remarkably obtuse. Capsule “light brown, shining, small, oval, mucronate, 3-sided,” (Bich.)—It does not ripen its seeds freely near Edinburgh; I never even met with a specimen in that state.

10. LUZULA.


Hab. Moist woods and shaded banks, frequent. Banks of the river at Rosslyn, Dr Parsons in Lightfoot. Auchindennay woods, Colinton, Braid Hermitage, &c. May. 2.

Great Hairy Wood-rush.—Culms 1–2 feet high, erect, leafy, striated. Leaves broadly linear, long, acuminate, nerved, the margin set with longish hairs; cauleine ones shorter. Panicle cymose, very compound, having a short central branch, and several longer ones, each supporting, as it were, another smaller panicle. Bracteas all ciliate at the margin. Flowers small, clustered in threes or fours. Leaves of the perianth lanceolate, aristate, chestnut-coloured, with a white scarlose margin. Capsule ovate, acute, brown.—Forms large tufts, and has a firm root.


Hab. Woods, common. Rosslyn, Auchindennay, and Arniston woods, &c. April, May. 2.

Small Hairy Wood-rush.—Root stoloniferous. Culms 6–12 inches high, slender, leafy. Leaves linear-lanceolate, those on the stem short, those from the base long and numerous; all hairy at the margin. Panicle formed of a few filiform longish branches, mostly divaricate or deflexed, and sometimes divided at their apex into 2 or 3 patent peduncles. Bracteas accompanied by a few hairs. Leaves of the perianth lanceolate acute, scarcely at all, or very minutely aristate, chestnut-coloured, shining. Capsule “3-sided, inversely heart-shaped, obtuse, suddenly narrower towards the middle, (Bich.) Seeds with a pale curved appendage at the top (coranecala), equal in length to the seeds.—Foliate resembling the preceding, but much smaller.


β. Culms taller; flowers collected into a dense roundish head; leaves slightly hairy. Juncus sudeticus, Wild.

γ. Culms taller; spikes less obtuse, on suberect peduncles; leaves excessively hairy.

Hab. Dry pastures, abundant. β. in turfy and boggy places. γ. in woods and on hedge-banks. April, May. 2.
HEXANDRIA. MONOGYNIA. 

Berberis.

Hairy Field-rush.—Root creeping. Culms erect, 3–12 inches high, leafy. Leaves tufted, linear or linear-lanceolate, acuminate, hairy at the margin, especially so at the orifice of the sheaths. Flowers collected in ovate oblong spikes, some of which are sessile, others pedunculate, and either erect or drooping. Bracteas; besides the foliaceous ones, there are several small scarious silvery ones at the base of each flower. Leaves of the perianth aristate, brown, shining. Capsule 3-sided, roundish or obovate, very obtuse. Seeds ovato-reniform, with a small white appendage (caruncula) at the base. is remarkable for its dense rush-like head of flowers and less hairy leaves. I have compared it with authentic specimens of Luz. sudetica, and find them agree in every particular, even to the seeds. is of a paler colour, and so hairy as to appear sprinkled with fine flax. It agrees so little with , that Mr Bicheno has certainly erred in placing them under one variety. At first sight it might be taken from its inflorescence for Juncus pallescens of Wahlenberg. Against my inclination, I am convinced that and are only varieties.

11. BERBERIS.


Common Berberry.—A bushy shrub, with pale, erect, spinous stems. Leaves petiolate, smooth, fasciculate, acid to the taste. Spines long, very acute, divericate. Racemes of many yellow flowers on pedicels. Petals 6, with 2 glands at their base. Stamens starting elastically on being irritated, anthers fulvous. Berries oblong, red, very acid.—Fruit used in pickles and preserves.

12. PEPLIS.


Hab. Watery places, or such as are overflowed in the winter. Braid Hill marshes, G. Don. Pentland Hills, Messrs Stewart and Arnott. July, August. 

Water Purslane.—Stems procumbent, sometimes floating, striking root at the joints, branched, 3–9 inches long, slender. Leaves opposite, scarcely petiolate, very obtuse, entire, smooth. Flowers reddish, the petals often wanting or exceedingly minute. Calyx 5, the valve segments 12, alternately large and small. Capsule round, somewhat pellucid, containing numerous seeds.

III. TRIGYNIA.

13. RUMEX.


* Flowers all perfect (containing both stamens and pistils). Lupatha or Docks.

† Inner valves of the perianth entire.

1. R. crispus, valves large, cordate, granuliferous; leaves


Curled Dock.—Stem angular, 2–3 feet high, erect, branched, smoothish. Leaves long, narrow, much curled at the margin, petiolate. Whorls of flowers rather crowded, the lower ones accompanied by small leaves. Valves greenish, broadly cordate, veined, furnished with an ovate reddish grain or tubercle.


Bloody-veined Dock.—Stem erect, about 3 feet high, branched, angular, smooth. Leaves generally, though not always, with red veins; petiolate, smooth, margin somewhat waved. Whorls of flowers small, distant, the lower ones sometimes accompanied by small leaves; the short peduncles of the flowers drooping. Outer and inner segments of the perianth quite entire, one at least of the latter bearing a red tubercle at its base.—The R. acutus of English Botany does not seem to be specifically distinct from this.

†† Inner valve of the perianth toothed.


Hab. Moist ground, in meadows, &c. King's Park, Mr Yalden. Common about Edinburgh, Dr Graham. July. ♂.

Sharp Dock.—Much resembling the last. Stem furrowed, erect, branched. Leaves long, often narrow. Whorls of flowers numerous, small, each accompanied by a small leaf; the flowers drooping, the valves scarcely or slightly toothed, all bearing red grains.


Broad-leaved Dock.—Stem erect, branched, 2–3 feet high, furrowed, roughish upwards. Leaves somewhat crenate and waved, the upper ones narrower and more acute. Whorls of flowers rather large, close; peduncles longish, capillary. Inner valves of the perianth large when in fruit, cordato-ovate, toothed towards the base; the grain or tubercle largest on the outermost valve.


Hab. Marshes on the sea-shore. Burntisland; and between Kinghorn and Pettycur, Mr Neill. July, August. ♂.
**Golden Dock.**—Stem 2–3 feet high, erect, sulcate, reddish, branched. Leaves long, plane, entire. Flowers forming numerous dense whorls of a rich yellowish colour when in fruit. Valves of the fruit all bearing an oblong red grain, and furnished at each margin with about 4 bristly teeth, fully as long as the valve.

**Flowers diacicious, (Acetosce or Sorrels.)**


_**Hab.** Meadows and pastures frequent. June. _

**Common Sorrel.**—Stems erect, mostly simple, 12–20 inches high, slender, deeply striate. Leaves; _radical_ ones on long petiolis, obtuse, somewhat succulent; _cauline_ ones sessile, more acute, the sagittate lobes embracing the stem. Flowers irregularly whorled, containing stamens and pistils on distinct plants. _Valves_ of the fruit-bearing flowers reddish, cordate, obtuse, graniferous according to Smith, but not in Dr Hooker’s specimens, and but seldom according to my own observations.—Whole plant acid, wholesome, and used for domestic purposes.


_**Hab.** Dry pastures, road-sides in sandy places, very abundant, especially between Edinburgh and the sea, about Newhaven. May, July. _

**Sheep’s Sorrel.**—Root slender, creeping. Stems 2–12 inches high, somewhat flexuose, slightly branched. Leaves varying in form, mostly lanceolate, but sometimes obovate, at others nearly linear, the lobes at the base, however, are always divaricate, and the leaf more or less contracted immediately above them. _Valves_ of the fruit-bearing flowers, ovate, reddish, never graniferous.—The plant containing pistiliferous flowers is smaller than that with stamiferous ones. Herb acid like the preceding.

14. **TRIGLOCHIN.**


_**Hab.** Bogs and marshy meadows, abundant. August._

**Marsh Arrow-grass.**—Leaves all radical, linear, fleshy, with sheathing stipules at the base. _Scape_ 6–12 inches high, rounded, simple. Flowers in a long, linear, raceme-like spike, small, greenish, on short erect peduncles. _Anthers_ sessile, within each inner segment of the perianth. " _Capsules_ 3, linear, united by a common receptacle, so as to form one 3-celled fruit, each separating by the base, and suspended by the extremity, never openings." _Hook._ When thus separated, the fruit has a strong resemblance to a 3-barbed arrow.


_**Hab.** Salt marshes on the sea coast, abundant. Inverkeithing Bay, Mr Nell. Guillon Links. About Queensferry, &c._ _May—August._

**Sea-side Arrow-grass.**—Somewhat stouter than the last, but similar in habit. It differs in the fruit being formed of 6 capsules. The segments of the perianth are also more obtuse.
Epilobium. OCTANDRIA. MONOGYNIA. 85

15. ALISMA.


Hab. Sides of streams, lakes, and ditches, very common. Lochend and Duddingston Loch, &c. July. ʃ.

Great Water Plantain.—Leaves all radical, on long petiols, acute, varying considerably in breadth, ribbed. Scape 1–3 feet high, erect, smooth, terminating in a sort of large whorled panicle, the branches of which are spreading, and slightly compound, with bracteas at their base. Flowers pedunculate, pale rose-colour. Petals obtuse, delicate, margin erose, very deciduous.—This has been ranked among the many valueless specifics against hydrophobia, especially in Russia.


Lesser Water Plantain.—Leaves all radical, on long petiols, smooth, not ribbed. Scape a foot long or less, but varying according to situation, being sometimes erect and taller than the leaves, at others decumbent. Flowers on long simple peduncles, arranged in 1–3 whorls, losing that character when the scape is decumbent, the peduncles then erect, and at right angles with the scape. Petals larger than the preceding. Germs acute, 5-angled, forming a squarrose head.

VIII. OCTANDRIA.

I. MONOGYNIA.

1. EPILOBIUM.
(Nat. Ord. Onagraceae, Hook. Scot. 2. p. 258.)

* Petals unequal.


Hab. Moist woods and rocks, rare. Habbie's How, Pentland Hills: Colinton and Abercorn woods, Maughan. Rosslyn and Auchindenny woods, Dr Graham.

Rose-bay Willow-herb.—Root creeping. Stems 2–5 feet high, erect, simple, or slightly branched upwards, round, smooth and leafy. Leaves subsessile, glaucous beneath. Flowers forming a large, irregular, terminal spike, very showy and ornamental, deep rose-coloured. Petals irregular, the larger ones obovate or obcordate. Stamens declined, the pollen blue. Stigma 4-cleft.

** Petals equal.

2. E. hirsutum, leaves semi-amplexicaul, ovate-lanceolate,


Great Hairy Willow-herb.—Root creeping. Stems 3-4 feet high, erect, branched, round, very hairy and leafy. Leaves dentato-serrate, spreading; the lower ones opposite, amplexicaul; the upper ones alternate, merely sessile. Flowers large, rose-coloured, somewhat corymbose, each accompanied by a leaf. Petals broadly obcordate. Capsule long, downy.

—Plant with a pleasant slightly acid odour, like that of some preserved fruits.


Hab. Sides of ponds and streams, frequent. Aberlady Links, near Luffness, Dr Graham. Old pits in a field east of the road leading from Dean Bridge to Caroline Park. Corstorphine Hill. July. 

Small-flowered Hoary Willow-herb.—Root not creeping. Stem 12-20 inches high, mostly nearly simple, round, firm, very leafy. Leaves minutely toothed, downy on both sides, sub-erect; the lower ones opposite, the upper ones alternate. Flowers in a sort of leafy raceme, small, pale rose-colour. —Differs from the preceding most constantly in the fibrous not creeping root, the small flowers, and suberect and smaller leaves.


Narrow-leaved Marsh Willow-herb.—Root fibrous. Stem round, erect, 6-15 inches high, slightly downy, leafy. Leaves opposite below, alternate above, slightly toothed, very minutely downy. Flowers in a sort of leafy raceme, very small, pale rose-colour; petals obcordate. —Plant varies in the pubescence of the stem and leaves, and in the latter being either somewhat toothed or quite entire.


Square-stalked Willow-herb.—Root fibrous. Stem erect, 12-18 inches high, branched, obtusely 4-angled; branches somewhat spreading. Leaves opposite at the base, alternate above, smooth, denticulate, sessile. Flowers few, with a leaf at the base of each, rose-colour; petals obovate, cloven. Stigma club-shaped, undivided.


Vaccinium. OCTANDRIA. MONOGYNIA.

Broad Smooth-leaved Willow-herb.—Root somewhat creeping. Stem very erect, 8-18 inches high, mostly simple, round, sometimes slightly downy. Leaves opposite below, alternate above, ovate, all sharply and irregularly toothed, pale green, often tinged with red, as is also the stem. Flowers few, in a leafy clustered raceme. Petals pale purplish, as long as the calyx. Capsules long, reddish.

2. Vaccinium.
(Nat. Ord. Vaccinum, Hook. Scot. 2. p. 231.)


Hab. Woods, frequent. King's Park, Mr Bainbridge. Rosslyn and Auchindenny woods, abundant. May. [July.]

Bilberry, Blueberry or Whorl-berry.—A low shrubby plant, seldom rising above 1 or 2 feet. Stems much branched in a tufted or bushy manner; branches green, angular. Leaves alternate, short-petiolate, smooth, veined, bright green. Flowers flesh-colour, axillary, solitary, pendent, roundish, ventricose, with the margin obtusely 5-cleft. Stamens 8-10. Anthers with a pore at the apex, and 2 horns. Berries large, black, glaucous, slightly acid.—The fruit is eaten, and often brought to market.


Hab. Moors and woods in gravelly places. Pentland Hills, Maughan. May. [July.]

Red Whorlle-berry.—A very low, little, shrubby evergreen plant. Stems mostly erect, 3-5 inches high, flexuose, angular. Leaves numerous, short-petiolate, resembling those of the common box, alternate, dark green, smooth and very shining above, the margin nearly entire or finely serrate. Flowers pale flesh-colour, on short simple peduncles, campanulate, 4-cleft. Anthers pointed with terminal pores, and without horns. Berries fine red, acid and astringent; very inferior to the following, but sold in the markets in Derbyshire under the name of Cowberries.


Cranberry.—Stems 6-10 inches long, filiform, creeping, radicating. Leaves very small, alternate, entire, glaucous beneath, on very short petioles. Flowers on simple peduncles, about an inch long, bearing a few minute bracteas. Corolla deeply divided into 4 ovate, fine red, reflexed segments. Anthers prominent, furnished with terminal pores, but without horns. Berries subglobose, red, 4-celled.—Fruit in much request for making tarts, &c.

3. ERICA.

1. E. cinerea, anthers with two serrated appendages at the
OCTANDRIA. MONOGYNIA. 

base; style somewhat exserted, stigma capitate; leaves ternate. 


Fine-leaved Heath.—Stem woody, erect, branched, bushy. Leaves linear-lanceolate, glabrous, somewhat furrowed behind. Flowers sub-whorled in long clustered racemes, drooping, purplish red. Corolla elliptic-globose, orifice 4-cleft. The crest-like appendage to the anthers is of itself sufficient to distinguish this from the other British species.—Varies with white flowers. 

2. E. Tetralix, anthers with two awns at the base; style as long as the ovate ventricose corolla; leaves in fours, ciliate; flowers capitate. Lightf. p. 205. Smith, Fl. Brit. p. 418. 


Cross-leaved Heath.—Stems branched, woody, erect, 6-12 inches high. Leaves in fours, very shortly petiolate, spreading, the margin revolute and ciliate. Flowers in a capitular cluster, drooping, ventricose, elegant, varying from white, pale rose, to deep red, orifice small, 4-cleft. 

4. CALLUNA. 


1. C. vulgaris. 


Hab. Moors and heathy places, very abundant. June, August. 

Common Ling.—Stems very woody, tortuous, much branched and tufted, 1-2 feet high, naked below. Leaves very small, obtuse, closely imbricated in four rows, dark green, mostly glabrous, but sometimes hoary from a minute pubescence. Flowers in a second spiked raceme, small purple red, drooping, ovate. Calyx double; the outer of 4 small green leaves, the inner much larger and coloured.—Used for various economical purposes. 

5. DAPHNE. 

(Nat. Ord. Thymeææ, Hook. Scot. 2. p. 204.) 


Hab. Moist woods, rare. Rosslyn woods, Dr Parsons in Lightfoot, March. 

Spruce Laurel.—Stem erect, 2-3 feet high, round, but little branched, naked below, bearing at the summit of each branch a tuft of spreading, bright green, shining and smooth leaves. Flowers yellowish green, each accompanied by a bractea, drooping. Perianth infundibuliform, the limb 4-cleft. Stamens in 2 rows. Berry ovate, black. 

6. ACER. 


A. Pseudo-Platanus, leaves fine-lobed, unequally serrate;
Polygonum. OCTANDRIA. TRIGYNIA. 89


Hab. Woods, hedges and plantations, frequent. May, June. 

Sycamore.—A large handsome tree, with spreading branches and luxuriant foliage. Leaves large, opposite, on long petiols, glabrous, pale beneath. Flowers in long, axillary, solitary, pendulous racemes, yellowish green; the pedicels villose. Fruit usually of 2 capsules, but sometimes 3, 4, and even 5, each furnished with a long membranaceous wing.—Wood chiefly used by turners.


Common Maple.—A small tree with a very rough cleft bark, and spreading branches. Leaves small, opposite, on petiols. Racemes erect, branched, the peduncles downy. Flowers greenish. Fruit with 2 large very divaricate membranaceous wings.—Wood used by turners, and in cabinet-work.

II. TRIGYNIA.

7. POLYGONUM.

(Nat. Ord. POLYGONEE, Hook. Scot. 2. p. 205.)

* Leaves ovate. Flowers in a single terminal spike. (Bistorta.)


Hab. Moist meadows, rather rare. Marshy ground at Roseburn, near Colthbridge, and banks of the North Esk, Maughan. Rosslyn woods, Mr Arnott.

Bistort or Snakeweed.—Stem 1-2 feet high, erect. Leaves entire, glabrous, somewhat flexuose, glaucous beneath. Spike dense, erect, cylindrical, delicate flesh colour, 1-2 inches long. Flowers trigynous, on short pedicles, with short brown bracteas at the base. Fruit triquetrous.—Leaves and petiols slightly acid, and sometimes boiled for the table. The name is derived from the tortuous root.

** Leaves lanceolate or elliptico-lanceolate.

† Flowers in terminal or axillary spikes. (Persicaria.)


a. aquaticum, leaves broad, glabrous, floating.

b. terrestre, leaves narrower, rough, with short appressed hairs; stem nearly erect.

Amphilious Perisicaria.—Root creeping. Stem 1-3 feet long, clothed with long tubular stipules, from which the leaves arise. Leaves very finely serrate. Spike terminal, pedunculate, mostly solitary, ovate or oblong, dense, rose-coloured. Fruit ovate, compressed.—A mischievous weed.


HAB. Moist places, ditches and waste ground, common. July, August. 

Spotted Persicaria.—Stem erect, 1 to above 2 feet high, branched in an alternate manner, and swelling above each joint. Leaves subsessile, or shortly petiolate, entire, rough at the margin, and mostly characterised by a large blackish spot. Spikes terminal and lateral, dense, obtuse, greenish or reddish, on long, slender, smooth peduncles.


HAB. Fields, waste ground and dunghills, not uncommon. August. 

Pale-flowered Persicaria.—Stem erect, 1-2 feet high, branched, the branches spreading, much swollen above each joint, succulent. Leaves large, ovato-lanceolate, shortly petiolate. Spikes very dense, usually larger than in the preceding, mostly of a pale green, but sometimes reddish, terminal and lateral.—The whole plant is of a paler colour than the preceding, more robust and succulent. The stem is sometimes spotted, and the leaves said to be hoary beneath.


HAB. Ditches and moist places. Burnstfield Links, Mr Neill. August, September. 

Biting Persicaria.—Stem 1-3 feet high, slender, branched, often reddish, somewhat swollen above each joint. Leaves rather pale green, acuminate and waved. Stipules striated, ciliated. Flowers not at all crowded, in lax, drooping, slender, lateral and terminal spikes. Stamens 6, very rarely 8.

†† Flowers axillary. (Polygonum.)


HAB. Waste places and road-sides, everywhere. May, September. 

Knot-grass.—Stems procumbent, 6-18 inches long, branched, rather strag-
gling, furnished at short intervals with short, sheathing, scariose stipules. Leaves alternate, varying extremely in size, and somewhat in shape, very shortly petiolate, glaucous and rather fleshy when growing near the sea. Flowers 2–5, greenish or reddish, edged with white, axillary and pedunculate. Stamens 8. Styles 3. Fruit large, triquetrous, dark, shining.

*** Leaves cordate. (Fagopyrum.)


Climbing Buck-wheat.—Stem twining around every thing in its way, 2–5 feet high, sometimes roughish, branched. Leaves entire, smooth, acute, petiolate. Flowers drooping, whitish or reddish, forming small lax spikes. Fruit black, triquetrous.—According to Smith, it varies with 6 stamens, and 2 styles.

III. TETRAGYNIA.

8. PARIS.

1. P. quadrifolia *.

Hab. Moist woods, rare. Wood about a mile south of Newbattle, near Dalkeith, Dr Parsons. May, June. %.

Herb Paris.—Root creeping. Stem 8–12 inches high, erect, smooth, simple, with 4 (rarely 5 or 6), verticillate, large, ovate, entire, smooth veined leaves, from the centre of which arises a solitary angular peduncle, bearing a single flower. Calyx of 4 lanceolate green leaves. Corolla of 4, linear ones of a similar colour. Stamens bearing the anther in their center, and on their inner surface. Berry purple black.—Plant esteemed poisonous.

9. ADOXA.
(Nat. Ord. Saxifragaceæ, Hook. Scot. 2. p. 256.)

1. A. Moschatellina.

Hab. Moist woods. Opposite the bleachfield, Rosslyn, Mr Neill. Wood near the Paper-mill at Colinton, Mr D. Stuart. Between Lasswade and Rosslyn, Mr Arnott. Braid Burn; bank opposite Melville Castle, Dr Graham. Arniston woods, and at Craiglockhart, but rare. April, May. %.

Tuberous Moschatel.—Root creeping, white, scaly. Stems 6 inches high, weak, slender, simple. Leaves; radical ones 2 or 3, on long petiols, ternate or bi-ternate, pale green; stem-leaves 2, small and simply ternate. Flowers 5, sessile, in a pedunculate head, one being always terminal, and

* One or more additional species of Paris have been recently discovered, which renders a specific character necessary; but I have not as yet seen any account of them.
forming a sort of square with the other 4. **Stamens** 8 or 10.—Plant with a musky smell, while the dew is on it; sometimes disagreeable, like that of a mangy dog.

### IX. ENNEANDRIA.

#### I. HEXAGYNIA.

1. **BUTOMUS.**


1. *B. umbellatus.*


**Hab.** Ponds and ditches, rare. Duddingston Loch, Mr J. Mackay. July. *f.*

**Flowering Rush.**—Root tuberous, horizontal. **Leaves** all radical, 2-3 feet long, erect, linear, acuminate, trigonous. **Scape** round, longer than the leaves, supporting an umbel of beautiful pink flowers, on long slender peduncles, with bracteas at their base, and a general triphyllous involucre. **Leaves** of the **perianth** alternately smaller. **Anthers** red.—A most elegant plant.

### X. DECANDRIA.

#### I. MONOGYNIA.

1. **PYROLA.**


**Round-leaved Winter-green.**—Root creeping. **Stem** short, leafy, angular, terminating above the leaves in a peduncle 5-8 inches high, bearing a terminal raceme of white flowers. **Leaves** alternate, petiolate, very glabrous, larger and thicker than in the following. The best distinguishing mark is the **style,** which is “twice as long as the fully-formed capsule,” suddenly declined, and curved upwards again at the apex. **Stamens** ascending.

2. *minor,* “leaves ovato-rotundate, crenate; stamens erect*; as long as the very short straight style, the stigma with 5 diver-

* The term *erect* is placed in opposition to *ascending* or *descending,* and signifies that they project in a straight line from the flower.
Chrysosplenium. DECANDRIA. DIGYNIA. 93


Lesser Winter-green.—Root creeping. Stem short, leafy, mostly simple. Leaves shining, smooth, petiolate. Peduncle about 6 inches high, angular, supporting a lax raceme of small, drooping, pale rose-coloured flowers, their pedicels shorter than the flower. Style very short, straight, with a large radiated stigma. Stamens short. Capsule rounded and depressed. —The whole genus is ornamental, and the flowers delicate.

II. DIGYNIA.

2. CHRYOSPLENIUM.

(Nat. Ord. Saxifrage., Hook. Scot. 2. p. 256.)


Alternate-leaved golden Saxifrage.—Root creeping. Stem 3–7 inches high, angular, succulent. Leaves numerous at the base, often on long petioles, one or two only on the stem, rounded-reniform, crenate, slightly hairy. Flowers forming a terminal, very leafy corymb; small, yellow mostly 4-cleft, the central one 5-cleft, and decandrous.


Hab. In the same situations as the last; and also in springy places on the mountains; very common. April, May. 74.

Common golden Saxifrage.—Root creeping. Stem 2–4 inches high, sometimes branched. Leaves opposite, crowded at the base, crenate, somewhat cor- date, petiolate. Flowers in a similar corymb to the last, mostly 4-cleft, and octandrous.—Habit in all respects similar to the last.

3. SAXIFRAGA.


* Radical leaves undivided, or obtusely lobed.


2. S. granulata, radical leaves rotundato-reniform, petiolate, obtusely lobed, cauline ones subsessile, acutely lobed; root gra-


White Saxifrage.—Root granulated, with small clustered tubers. **Stem** 2–3 inches high, somewhat branched upwards, so as to form an irregular panicle when the plant is luxuriant, but it frequently gives off only 1 or 2 side clusters of flowers, with not more than one flower expanded on each at the same time. The stem is covered with a glandular pubescence. **Flowers** large, white, rather fragrant. **Capsule** half inferior.—A double variety is common in gardens.

**Leaves more or less deeply divided.**


**Hab.** Moist rocks and wall-tops, rare. King's Park. Top of a wall near Craiglockhart, G. Don. Links a little to the east of Cocketzie; walls near Kirkcaldy, Maughan. Stony ground above the west end of Duddingston Loch, Dr Graham. Don's second station is destroyed; but it grows also on the wall immediately surrounding Craiglockhart, and on the rock itself. May. June. 

Rue-leaved Saxifrage.—Whole plant succulent, especially the leaves. **Stem** 1–5 inches high, covered with viscid glandular hairs, reddish, and slender, but erect, and rather firm, slightly branched, particularly upwards, but rarely, so as to form any thing like a panicle. **Leaves** mostly trifid towards the base, sometimes 5-cleft, the upper ones chiefly undivided, often reddish. **Flowers** white, very small, mostly solitary, on longish peduncles, erect. **Capsule** inferior, urceolate.


Moss Saxifrage, or Ladies' Cushion.—"Plants growing in crowded tufts, and throwing out long slender shoots, which have distant and mostly entire leaves, with clusters or buds of young leaves at their extremities, and frequently in the axils of the leaves themselves. The leaves nearest the root are 3–5-cleft, varying much in size and breadth, glabrous or pilose about their bases. All the points are acute, in the upper ones frequently terminated by a short bristle. **Flowering stem** 3–6 inches long, branched and panicked, glabrous, a little viscid above; its leaves few, trifid below, the rest undivided. **Flowers** 6–10, rather large. **Petals** obovate, 3 or 4 times as long as the calyx, cream-coloured. **Calyx** with acute segments, slightly viscid. **Germin** almost wholly inferior."—A most variable plant, and I am happy in being able to give the character and description of a better authority than my own,—that of my acute friend Dr Hooker.

4. **SCLERANTHUS.**


1. **S. annuus**, segments of the perianth erect after flowering;

**Hab.** Corn-fields and bare, sandy or gravelly places, very common. Var. *S. perennis* does not grow in this neighbourhood. July, August. ○

**Knawel.**—Stems numerous, spreading, branched, slender, 3-6 inches, high. *Leaves* keeled, membranaceous at the base. *Flowers* very small, green, in axillary clusters. *Perianth* " urceolate, ribbed, with 5 ovato-lanceolate segments, white and membranaceous at the edge, spreading when in flower, and erect when in fruit." (Hook.) In var. *S.* the stems are shorter, more or less prostrate (the flowering branches are erect), and the whole plant more dense: the only difference approaching towards a specific one, is, the broader white margin of the segments of the perianth, and their less acute apex; but surely this is not sufficient to separate plants in every other respect similar. I agree, therefore, with Dr Hooker in thinking them the same.

Mr Arnott and I met with var. *S.* in flower on a wall-top near Kincardine in May, it having survived the winter, and acquired much of the habit of *S.* This spring (March and April 1823), I have seen it plentifully in flower on wall-tops between Corstorphine and Kirkliston.

**5. SAPONARIA.**


**Hab.** Woods and waste bushy places. Between Dean and Ravelston. Near Rosslyn Chapel. Banks of the Esk above Coal-pits; and side of the mill-lead opposite to the old bridge at Musselburgh, Maughan. Behind Burntisland, Mr Neill. July, August. ¾.

**Soapwort.**—Stems numerous, erect, rounded, smooth, about 18 inches high. *Leaves* opposite, connate, entire, glabrous, ribbed. *Flowers* in a roundish, terminal panicle, large, numerous, pale rose colour. **Petals** with obcordate limbs.—Produces a lather with water like soap.

**6. DIANTHUS.**


**Sweet William.**—Stems about a foot high, rounded, glabrous, sometimes-branched. *Leaves* tufted at the base; those of the stem distant, opposite, somewhat petiolate, but connate, entire, varying in breadth. *Flowers* forming a flatish head, numerous, red, or varied with white. **Petals** shortly jagged. **Calycine scales** ovate at the base, then subulate.—Innumerable varieties are cultivated in gardens. It cannot assuredly be a really indigenous plant, but I have inserted it as the student is liable to meet with it in an apparently wild state. According to Hoffman it is a native of Germany.

2. *D. deltoides,* flowers solitary; calycine scales mostly two,


Maiden Pink.—Plant glaucous. Stems numerous, 5–8 inches high, slender, somewhat smooth, simple or slightly branched. Leaves linear-lanceolate, those of the barren stems obtuse, opposite, small, very slightly hairy. Flowers pedunculate, solitary, red, rarely white. Petals variously notched, sometimes merely bifid at the apex.

III. TRIGYNIA.

7. SILENE.


Bladder Campion.—Plant glaucous; highly so by the sea-side. Styles 3–5. In $\alpha$, the stem is 1 or 2 feet high, branched upwards in a dichotomous manner, and forming an irregular panicle. Leaves tufted at the base, spatulate, cauline ones opposite, ovate, mostly smooth and entire, rarely ciliate, and rough with glandular hairs. Flowers numerous, somewhat drooping, on slender peduncles. Petals white, cloven, frequently quite destitute of a crown. Calyx finely reticulated with coloured veins. In $\beta$, the stems are slender, more or less procumbent; the leaves much smaller, and often very minutely serrate, especially in the younger ones; the calyx and the flower larger; the petals broader, and the limb rather obturate than cloven. The whole plant is excessively glaucous.

For a length of time I opposed the above union, which Dr Hooker, following Wahlenberg, has adopted in his Flora Scotia; but I have been compelled, unwillingly enough, to imitate that excellent naturalist, as I have altogether failed to discover a permanent specific difference.


Hab. Dry pastures and rocky places, rare. Hills near North Queensferry, Mr Mackay (Sm.), Mr Brown (Maughan). July. $\gamma$.

Nottingham Catchfly.—Stems about a foot high, simple, erect, viscid, espe-
Stellaria.  Decandria. Trigynia. 97
cially above. Leaves rather crowded at the base, ovate, contracting into a long stalk; cauline ones lanceolate, subsessile. Panicle slightly branched, the flowers drooping to one side. Petals white, the limb deeply bifid, with a cloven crown. Calyx membranaceous, ribbed. Stamens 5 longer than the rest.

8. Stellaria.


Hab. Woods and shady places, rare. Banks of the North and South Esk, Maughan. May, June. \( \dagger \).

Wood Stitchwort.—Root creeping. Stems 1-2 feet high or more, weak, rounded, hollow, somewhat pilose. Leaves rather large, pale green, tender, entire. Panicle terminal, lax, dichotomous, leafy at the base of each division. Flowers erect, small, white. Calycine segments with white margins. Petals spreading, bifid almost to the base, the segments divaricate. Peduncles deflexed when in fruit.


Hab. Cultivated ground and waste places, very common. Almost the whole year. \( \odot \).

Common Chickweed.—Stems slender, weak, 2-12 inches long, procumbent, or erect when growing among other plants, well marked by a line of hairs on one side, which at each joint passes alternately to the opposite side. Leaves pale green, petiolate below, sessile at the top. Flowers small, white, on solitary, mostly axillary peduncles. Petals divided nearly to the base, and shorter than the calyx.—When boiled resembles spinach.


Hab. Dry banks, hedges, and woods, very frequent. May. \( \dagger \).

Greater Stitchwort.—Root creeping. Stems decumbent at the base and very slender, becoming stouter upwards, quadrangular, 12-18 inches high. Leaves opposite, sessile, very acuminate, revolute at the margin, glabrous. Flowers large, white, on longish slender peduncles, and forming a lax, erect, somewhat dichotomous panicle. Petals broader than in the two following species, nearly twice as long as the nerveless calyx.—A lively flower, and very ornamental in spring, frequently growing plentifully along with Hyacinthus non-scriptus and Lychnis dioica.


Hab. Fields, hedges, woods, &c., very common. May, June. \( \dagger \).

Lesser Stitchwort.—Smaller and more slender than the preceding. Stem 1-2
feet high, angular, smooth, with a terminal much branched panicle. 

Leaves much smaller than the preceding, entire at the margin, not glaucous. Flowers small, white, pedunculate. Petals deeply cleft, segments linear, a little longer than the calyx, the segments of which are 3-ribbed and white, and very scarioso at the margin.


HAB. Bogs and marshes. Lochend and Duddington Loch, Maughan. June, July. 7.

Glaucous Marsh Stickwort.—Stems somewhat decumbent at the base, quickly becoming erect, slender, angular, smooth. Leaves linear-lanceolate, not very acute, quite glabrous in every part, very glaucous. Flowers; the lower ones on long axillary peduncles, but they form also an erect, terminal, slender, slightly branched panicle, the branches often in threes. In my specimens, there is no flower unaccompanied by a 2-leaved reddish scarioso involucrle, the lowest involucrle being properly the commencement of the panicle. Petals broader than the last, and narrower than in S. holostea. Calyx 3-nerved.—Habit near that of holostea.


HAB. Bogs, ditches, and rivulets, common. June. 8.

Bog Stickwort.—Stems mostly procumbent, but erect when mixed with other plants, slender, angular. Leaves small, glaucous, entire. Panicles lateral and terminal, few-flowered, with lanceolate, minute bracteas. Flowers very small, white. Calyx 3-nerved.—Diffs from Stellaria in the stamens and petals being perigonous, and forms the genus Larbrea of St Hilaire, Mem. du Mus. v. 3.

9. ADENARIUM, Rafinesque.


1. A. Peploides.


Sea-side Sandwort.—Root long, creeping. Stems numerous, prostrate, branched, thickly clothed with sessile, ovate, entire, opposite, very smooth, bright green, somewhat reflexed, fleshy leaves. Flowers in the upper divisions of the stem, small, white, solitary, almost sessile. Calyx with 5 lanceolate, subobtuse, nerveless segments. Petals 5, small, narrow, obovate. Stamens with small glands at their base, and inserted, as well as the petals, on the base of the 3-valved capsule.

10. ARENARIA.


* Without stipules. Leaves ovate.

1. A. trinervis, leaves ovate, acute, petiolate, mostly 3-nerved;

_Hab._ Shaded and moist places. Mavis-Bank, Dr Parsons in Lightfoot. Newbattle woods, Mr Neill. Colinton and Rosslyn woods, and hedges near Redhall, Maughan. Kinleith, Mr Arnott. May. ☒.

**Three-nerved Sandwort.—** Stems very slender, weak, suberect, 6–12 inches high, branched, pubescent. *Leaves* 3–5 nerved, ciliate, the uppermost sessile. *Flowers* very small, white, on long solitary peduncles, axillary from each of the upper divisions of the stem. _Petals_ not longer than the acute calyx.


_Hab._ Dry banks, walls, and waste places, frequent. Abundant in the King’s Park, Mr Bainbridge. May—July. ☒.

**Thyme-leaved Sandwort.—** Plant rather rigid. Stems very numerous, spreading, branched, 2–6 inches high, minutely pubescent. *Leaves* numerous, very small, obscurely nerved. *Flowers* small, white, on short erect peduncles, forming small leafy panicles. _Petals_ rather shorter than the calyx. _Calycine leaves_ ovate, hairy, with a membraneous margin; the two inner ones 3-ribbed, the three outer 5-ribbed.

**Without stipules. _Leaves subulate._**


_Hab._ Rocky subalpine pastures, rare. King’s Park abundantly, Lightfoot. Blackford Hill, Maughan. May, June. ☍.

**Spring Sandwort.—** Stems very numerous and tufted, 3–5 inches high, erect or somewhat spreading, slightly pubescent, bearing terminal, few-flowered panicles. *Leaves* numerous, short, striated, erecto-patent, connate at their base. *Flowers* white, pedunculate. _Petals_ not much longer than the calyx. _Calycine leaves_ ovato-acute, hairy, 3-ribbed, shorter than the mature subcylindrical capsule.


_Hab._ Walls, rocks, and stony places, rare. Cramond Island, Mr Yalden in Lightfoot. Near Pettycur, G. Don. June, July. ☒

**Fine-leaved Sandwort.—** Stem sometimes branched from the base, or irregularly upwards, erect, slender, 2–8 inches high. *Leaves* subulate, connate at their base, striated, glabrous, short, but longer than the preceding. *Flowers* very small, white, on solitary very slender peduncles. _Calycine leaves_ very acuminate, 3-ribbed, much longer than the petals.

**Stipules at the base of each pair of leaves.**

5. _A. rubra_, stems prostrate; leaves linear, plane, somewhat...

Hab. Sandy fields and waste places, very common. June, July. 〇.

Purple Sandwort.—Stems much branched, especially from the base, procumbent, spreading, round, glabrous. Leaves numerous, very narrow, slightly hoary or glaucous. Stipules 2, ovate, cloven, whitish, membranaceous, sheathing the stem at their base. Flowers purple red, many, on pubescent, viscid, solitary peduncles, forming very irregular panicles. Calyx hairy, ribless, about the same length as the ovate petals. The peduncles are deflexed after flowering.


Sea-side Purple Sandwort.—This species resembles the last very nearly in habit, but differs in the more fleshy and awnless leaves; the much longer capsule (exceeding the calyx), and above all in the seeds, whose characters are specified above.

IV. PENTAGYNIA.

11. SEDUM.


* Leaves plane.


Orpine.—Stems numerous, 1–2 feet high, thickish, simple, glabrous, spotted. Leaves large, scattered, ovate, sessile, fleshy, smooth, glaucous. Flowers purple, dense, in a terminal corymb.—Ornamental.

** Leaves rounded, sessile, simple at their base.


Hab. Walls and rocks, rare. Colinton woods, Mr Arnott. June. 〇.

Thick-leaved Stone-crop.—Stems decumbent, somewhat creeping, very slender, in small tufts, the fertile ones 2–3 inches high, erect, viscid upwards. Leaves very obtuse and fleshy, pale glaucous green, frequently tinged with red, alternate on the flowering stems. Panicle of very few flowers. Flowers pinkish white. Anthers dark red.—Varies with 6 petals and 12 stamens; capsules also sometimes more than 5.


**Hairy Stone-crop.**—Stem erect, mostly quite simple, 3-5 inches high, spotted, pubescent, especially above. **Leaves** scattered, fleshy, convex beneath, generally reddish, more or less clothed with viscid hairs. **Panicle** of very few pinkish white flowers, on hairy peduncles. It sometimes happens that 1 or 2 small barren stems are produced at the base, on which the leaves, according to Dr Hooker, are cylindrical.

***Leaves rounded, produced below the point of insertion into a kind of spur, which is pressed to the stem.***


**Hab.** Rocks, walls, roofs of cottages, &c., frequent. King's Park, abundant, Mr Bainbridge. June. ☼

**Biting Stone-crop.** *Wall Pepper.*—Stems tufted, branched, 1-3 inches high, entangled. **Leaves** dark green, very fleshy, obtuse, somewhat compressed, densely imbricate. **Cymes** leafy, few-flowered. **Flowers** bright yellow. **Petals** ovate, acute.—Pungent and biting to the taste.


**Yellow Stone-crop.**—Stems 6-8 inches high, branched, with short, barren, often reflexed ones at the base. **Leaves** crowded on the barren stems, scattered on the flowering ones, succulent, glabrous, thickly subulate, erecto-patent. **Flowers** terminal, numerous, bright yellow. **Calyx** acute. **Petals** mostly 6, acute, accompanied by 12 stamens.

12. **Oxalis**.


**Hab.** Woods and hedges, extremely common. April—June. ☼

**Wood Sorrel.**—Root white, succulent, scaly. **Scape** 2-4 inches high, scaly, slender, 1-flowered, with 2 small bracteas above the middle. **Leaves** on slender peduncles, bright green, sometimes purplish. **Flower** delicate white, beautifully veined with pink or purple, drooping.—Taste agreeably acid.

13. **Agrostemma**.


1. **A. Githago**, hairy; segments of the calyx much longer


Corn Cockle.—Whole plant hairy. Stem 2–3 feet high, rounded, branched; branches spreading. Leaves opposite, linear-lanceolate. Flowers solitary, terminal, large, purple. Calyx 10-ribbed, with 5 long, linear, patent segments or teeth.—Habit much that of a Lychnis.

14. LYCHNIS.


Hab. Moist meadows and pastures, very common. King’s Park, &c. June, July. 

Meadow Lychnis or Ragged Robin.—Stem 1–2 feet high, angular, somewhat viscid towards the summit, rarely branched, unless at the base. Leaves glabrous, linear-lanceolate, opposite, connate at the base. Panicle rather loose, slightly branched in a forked trifid manner, with bractae at each division. Flowers rose-colour, rarely white. Calyx and peduncles purplish red.


Red German Catchfly.—Plant tufted, and fixing itself firmly in the crevices of rocks by its tough roots. Stem about a foot high, angular, dark coloured, and very clammy beneath the joints. Leaves lanceolate, opposite, connate. Flowers in a sort of dense cluster or panicle, handsome, large, rose-coloured. Petals furnished with an acute cloven crown. Capsule ovate.—Ornamental, cultivated in gardens, with a double flower.


a. flowers red. E. B. t. 1579.

b. flowers white. E. B. t. 1580.

Hab. Hedges, woods, thickets, &c. very common. b. rather rare about Edinburgh; sea-side at Caroline Park, Mr Neill. May, September. 

Red and White Campion.—Stems 1–2 feet high, branched, hairy, very slightly viscid at the joints. Leaves hairy, ovato-lanceolate, sessile, subconnate. Calyx 10-ribbed, in the fertile flowers ovate, ventricose; in the sterile ones cylindrical. Flowers forming an irregularly-branched, low panicle. Petals partly cleft, crowned.—The white var. becomes fragrant towards evening.

15. CERASTIUM.

* Petals not longer than the calyx.

1. C. vulgatum, hairy, somewhat viscid, suberect; leaves

Han. Fields, waste ground, and road-sides, not frequent. In no fixed station. May, July. ☐.

Broad-leaved Mouse-ear Chickweed.—Whole plant very hairy. Stems 6-10 inches high, more or less branched, especially at the base; central stem generally erect, the others mostly ascending. Leaves ovate, or even roundish, obtuse, with a very minute point, pale, rather yellowish green. Flowers in dense terminal heads or clusters. Capsule slightly curved, twice the length of the calyx.—Plant sometimes quite destitute of viscosity.


Han. Fields and waste grounds, very abundant. May, September. ☐.

Narrow-leaved Mouse-ear Chickweed.—Whole plant hairy. Stems 6-16 inches long, mostly spreading or procumbent, more or less viscid, especially in warm weather. Leaves dark, and somewhat dull green. Flowers in a sort of panicle, and mostly, as Hooker has justly observed, shorter than the pedicels when in fruit. Capsule resembling the last, and the stamens 10, fertile in both.—Plant erect, when supported by neighbouring weeds.

The form of the leaves I consider as the best specific distinction between these two species. They vary somewhat in both; when they change in the first, it is by becoming longer, but at the same time more rounded and obtuse at the extremity, approaching to obovate: in the second the reverse takes place; the longer the leaf becomes, the more it approaches to lanceolate.


Han. Wall-tops, dry pastures, especially near the sea. Stations for C. semidec. are Arthur's Seat, Dr Parsons in Lightfoot. Walls about the King's Park, Maughan. Stations for C. tetrand. are walls about Edinburgh, on the Calton Hill and Arthur's Seat, Sir J. E. Smith. Inchkeith; Inchcolm; and near Prestonpans, Dickson. Isle of May, D. Don. May, June. ☐.

Small Mouse-ear Chickweed.—Plant mostly very viscid, 2-6 inches high, slender, erect, or sometimes ascending, decumbent at the base, branched in a somewhat dichotomous manner. Leaves varying extremely in size, and somewhat in form from ovate to ovato-lanceolate, the radical ones spatulate. Flowers panicked, pedunculate, a solitary one often arising from the fork of the branches, and having in fruit a long peduncle, very rarely indeed deflexed, even in what is called C. tetrandrum. Petals more or less bifid at the apex, 5 or 4, the stamens corresponding in number, both sometimes occurring on the same individual.

After a most minute investigation, the only difference I can find between the two plants I have united, is the number of petals and stamens, which
are well known not to be constant, even on the same plant. In the leaves there is none, for the two run completely into each other. My friend, Mr Arnott, thinks they bear the same relation to each other in the form of the leaves as the two first species, but though this may be the case in the extreme varieties, they do not in their change follow the rule mentioned in the observation under C. viscosum. The difference of habit seems to be owing entirely to situation, which has the same effect upon it as on Stellaria media. In moist hollows, among the rocks of the King's Park, I have seen it 8 inches long, in short, C. tetrandrum in habit; not 2 yards from it, in exposed sunny dry spots, from 1-3 inches; in short, C. semidecantrum. The earlier flowers have been observed by Mr Arnott to be almost all tetrandrous.

* Petals longer than the calyx.


Han. Fields and gravelly pastures, rare. Guillon Links, Mr Arnott May, September. 7.

Field Chickweed.—Root creeping. Stems 4-10 inches long, ascending, slender, pubescent, somewhat tufted. Leaves pubescent, but varying greatly in the degree. Flowers terminal, few, large, white; branches of the panicle, viscid, pubescent. Calyxine leaves, ovate, obtuse. Capsule not longer than the calyx.

16. SPERGULA.


Han. Corn-fields and cultivated grounds, very abundant. July, August.

Corn Spurrey.—Stems 6-12 inches high, swelling at the joints. Leaves narrow, linear, rounded, glabrous, or a little pubescent, of 2 bundles from each joint, spreading in a whorled manner. Panicle spreading, branched, of many flowers; branches divaricate. Petals ovate, white, rather longer than the calyx. Stamens often 5. Capsule nearly twice as long as the calyx. Seeds roundish, dotted with raised points; varying extremely in the breadth of the margin.—Description nearly in Hooker's own words. He is convinced that it does not differ from S. pentandra of Smith. I certainly have always considered them the same, but am happy to quote so good an authority.


Han. Bogs and wet sandy places, not common. Duddingston Loch; South Queensferry; Cockenzie Downs, Mr Neill. Pentlands, in various places, Mr Arnott. Near Luffness, Dr Graham. King's Park. July, August. 7.
Aguimoxia. DODECANDRIA. DIGYNIA.

Knotted Spurrey.—Plant slightly tufted, glabrous. Stems 1-6, spreading, or suberect, very slender, but little branched, 4-8 inches high. Leaves small, numerous, subulate. Flowers few, terminal, large for the size of the plant, white, longer than the nerveless calyx. Petals obovate, obtuse.

XI. DODECANDRIA.

II. DIGYNIA.

1. AGRIMONIA.

(Nat. Ord. Rosaceae, Hook. Scot. 2. p. 263.)


Hab. Fields, waste places, and road-sides, not frequent. King's Park, Mr Bainbridge. July. 7/. Agrimony.—Stem 1-2 feet high, hairy, subangular. Leaves dark dull green, pinnate. Leaflets serrate, having much smaller ones intermediate, hairy. Flowers in a long, narrow, simple, or branched spike, deep yellow, almost sessile. Calyx furrowed. Fruit rough, with hooked bristles.—Employed medicinally by the country people.

III. TRIGYNIA.

2. RESEDA.

(Nat. Ord. Resedaceae, Hook. Scot. 2. p. 204.)


Hab. Waste places. Hills between Pettycur and Burntisland, Mr Neill. Near Kirkcaldy, Mr Chalmers. Near Raith, D. Don. Debris of Salisbury Craigs (recently introduced), Mr D. Steuart. July, August. Wild Mignonette or Base Rocket.—Stems growing in a bushy manner, rounded, 1-2 feet high. Leaves divided into linear segments, undulate more
or less at the margin. Flowers numerous, yellow, in long spikes; the pedicels longer than in the preceding. Petals 6, variously and unequally lobed. Nectary green, somewhat fringed.

3. **EUPHORBIA.**

*(Nat. Ord. Euphorbiaceæ, Hook. Scot. 2. p. 203.)*

*Leaves linear, or linear-ovate.*


Hab. Dry gravelly fields and pastures, rare. Burntisland, Lightfoot. Field at the marl-pit near Muttonhole; Near Crossgate-toll, and near Musselburgh, Maughan. Fields North of Carlowrie, abundant, Mr Falconer. Field near St Germans, and corn-fields about Burntisland, plentiful, Mr D. Steuart. July, September. Dwarf Spurge.—The smallest British species, being rarely more than 6 inches high. Stem slender, simple or branched at the base, rounded. Leaves rather erect, linear, entire, sessile. Umbel small, varying from 2-4, or even 5, primary rays. Flowers very small. Nectaries 4, roundish, with 2 greenish horns. Capsule glabrous.


Hab. Woods, very rare. Colinton woods, Mr Arnott. July, August. Cypress Spurge.—Root creeping. Stems numerous, a foot high. Leaves glabrous, entire, broader on the flowering stem, and less numerous than on the sterile stems; small branches often arise from the flowering stem, and sometimes produce flowers; on these the leaves are also much narrower and more numerous. Involucella yellow green. Umbel 7-15-rayed. Nectaries 4, tawny yellow, lunate. Capsule smooth.—Milky juice very abundant.


Hab. Woods, rare. Wood near a rivulet at Abercorn, 13 miles west of Edinburgh, Mr J. Mackay. Near Gladsmuir Kirk, in a lane leading from the Haddington road to Elvingston; and in a field near West Pilton, 7 miles north-west of Edinburgh, Maughan. July. Leafy-branched Spurge.—Stem about a foot high, erect, with numerous lateral, leafy branches, the uppermost often producing flowers as in the preceding. Leaves all uniform, numerous on the barren stems. Umbel of 5-8 rays. Involucella large, broad. Nectaries somewhat cordate, tawny brown, with 2 lateral horns. Capsule glabrous.

**Leaves more or less obovate.**

4. **E. Peplus**, umbel mostly of 3 primary rays; involucella cordato-ovate; leaves obovate entire; nectaries lunate, termi-


Petty Spurge.—Whole plant of a pleasant light green colour, or tinged with purple, 6-10 inches high, somewhat branched at the base. Leaves scattered, on very short petiols, entire, glabrous. Umbel pretty constantly of 3 primary rays. Nectaries 4, lunate, the two extremities passing into two acute horns, yellow. Capsule glabrous.


HAB. Corn-fields and neglected gardens, frequent. King’s Park, and corn-fields about the Pentland Hills, Mr Bainbridge. July, August. ○.

Sun Spurge.—Stem 6-14 inches high, often branched at the base, slightly hairy upwards. Leaves bright green, scattered, glabrous. Involucella and involucella almost similar. Nectaries green, without horns. Capsule glabrous.—Called Little-good by the Scotch. This and the preceding have an abundant acrid milky juice, which is used to destroy warts.

IV. DODECAGYNIA.

4. SEMPERVIVUM.

(Nat. Ord. SEMPERVIVAE, Hook. Scot. 2. p. 232.)


House-leek.—Plant propagated by runners, which terminate in tufts of densely imbricated fleshy, spreading leaves. Flowering stems 8 or 10 inches high, robust, hairy, terminating in spreading corymb of 2 or 3 racemose branches. Flowers subsessile, pale red. Petals lanceolate, spreading. In regard to the internal structure, I shall quote Dr Hooker’s valuable description. “The number of stamens is in reality 24, of which 12, inserted 1 at the base of each petal, are perfect, the rest, alternately with the petals, small and abortive; some bearing anthers, open longitudinally and laterally, producing, instead of pollen, abortive ovules: others resembling a cuneiform pointed scale, in the inside of which, upon a longitudinal receptacle are likewise ranged abortive ovules, as in the real germin; thus exhibiting the most complete transition from stamens to germin in the same individual flower.”

XII. ICOSANDRIA.

I. MONOGYNIA.

1. PRUNUS.

(Nat. Ord. ROSACEÆ, Hook. Scot. 2. p. 265.)

1. P. Padus, flowers in pendulous racemes; leaves obovate,

**Hab.** Woods. Colinton woods, and on the banks of Bevelaw Burn, Maughan. Auchindenny and Arniston woods, May. "

**Bird Cherry.**—A small tree, with a smooth bark. Leaves alternate, obovato-acuminate, serrate, glabrous, deciduous. Flowers white, racemed, on short pedicels. Petals delicate, small, eroso-crenulate. Fruit a drupa, small, oval, black, bitter, the nut within rugose.—Ornamental. When or where could Lightfoot have seen the fruit the size of grapes?


**Wild Cherry.**—A tree sometimes of large size; branches cinereous, polished. Leaves varying in form, unequally and often obtusely serrate, glabrous above, more or less pubescent beneath, especially while young. Stipules glandulose at the margin. Rays of the umbel few, long. Flowers delicate, white, large, somewhat drooping. Calyx at length reflexed. Fruit roundish, rather large, red or black.—Origin of the garden cherry.


**Hab.** Woods and hedges. Colinton woods, Maughan. April. "

**Wild Plum-tree.**—A middle-sized tree, without spines. Leaves ovate to ovato-lanceolate, on short petiols, serrate, when young pubescent on both sides. Flowers white, rather large, solitary, or in pairs, on short peduncles. Fruit large, roundish or somewhat ovate, blue-black, with a fine bloom.


**Hab.** Woods and hedges. Pentland Hills, G. Don. May. "

**Wild Bullace-tree.**—A small and bushy tree, with the branches often terminating in a spine. Leaves on short petiols, serrate, subpubescent beneath, especially at first, but sometimes becoming glabrous. Flowers mostly in pairs, but sometimes solitary, white. Petals obovate. Fruit roundish, black, with a fine blue bloom, very austere to the taste. A white variety sometimes occurs.—Used as a preserve.


**Hab.** Woods and hedges, very common. April. "

**Sloe-tree, or Black Thorn.**—A bushy, rigid shrub, with crooked, very spiny branches, clothed with a blackish, smooth bark. Leaves chiefly appearing...
after the flowers, more or less elliptical, serrate, petiolate. Flowers on short peduncles, smaller than the preceding, white, very numerous and conspicuous. Fruit small, globular, black, with a blue bloom, very austere, yet sometimes preserved with sugar.—Used also in adulterating Port wine.

II. PENTAGYNIA.

2. CRATAEGUS.*


HAB. Woods and hedges, almost everywhere. June. ½.

Hawthorn, or White Thorn.—A small bushy tree, with smooth bark; the wood hard. Branches rigid and spinose. Leaves petiolate dark green, shining, mostly 3-5-lobed, the lobes unequally cut, and serrate. Flowers corymbose, white or tinged with red, very numerous, handsome, mostly scented. Calyx reflexed, more or less pubescent. Petals roundish, concave. Fruit roundish or oval, red, or yellowish.—The most approved plant for making fences as it endures clipping to any extent.

3. PYRUS.


HAB. Woods and hedges, frequent. Rosslyn woods. May. ½.

Crab-Apple.—A small tree, with spreading knobby branches; sometimes retaining a shrubby character, when kept down in hedges. Leaves ovate, more or less acute. Flowers large, very beautiful, delicate white, tinged with rose-colour, especially on the outside. Fruit roundish, scarcely an inch in diameter, green or reddish, very austere, and acid.—Used to make Verjuice. Origin of the Garden Apple.


Mountain Ash, or Quicken-tree (in Scotland Roan-tree).—A middle-sized bushy tree, with handsome foliage, flowers, and fruit. Bark smooth. Leaves pinnate, with an odd leaflet; leaflets about 5 pair. Flowers white, small, very numerous, forming a flat, broad, much branched corymb, odor considerable. Fruit orange-red, size of a pea, acid and austere.—A celebrated protection against evil spirits in the Highlands of Scotland, where a jelly is also prepared from the fruit.

* An excellent paper on the genera of the section called Pomaceae of the Natural Order Rosaceae, by Mr Lindley, will be found in Linnaea Transactions, vol. xiii. p. 88.


**Hab.** Woods, often among rocks. Rocks in the King’s Park, near the Powder Magazine, Maughan. June. 7.

White Beam-tree.—A small tree, variable in habit, according to situation. Young branches tomentose. *Leaves* more or less deeply cut and serrate, conspicuous from their white under surface, above marked with parallel veins. *Flowers* in a flattish corymb, white. *Petals* concave. Fruit scarlet, farinose, roundish oval, austere.

4. *SPIRAEA.


* Shrubby.


**Hab.** Woods. Arniston woods, Craigiehall, and Cramond Bridge, Maughan. Scarcely wild in these stations. July. 7.

Willow-leaved *Spiraea*.—A bushy shrub, from 2-4 feet high, with numerous erect stems, and a yellowish-tawny smooth bark. *Leaves* subsessile, glabrous on each side. *Flowers* dense, in erect blunt clusters. *Petals* rose colour.—Ornamental and common in gardens.

** Herbaceous.

2. *S. Filipendula*, leaves interruptedly pinnate, the leaflets uniform, cut; flowers paniculato-cymose; styles many. *Lightf.* p. 259. 


Common Dropwort.—Root tuberous. Stem a foot high, branched upwards, and terminating in a lax, erect, cymose panicle. *Leaves* pinnate, the leaflets with intermediate smaller ones. *Stipules* united, roundish, dentate. *Flowers* by no means crowded, yellowish-white, pinkish before expanding. *Styles* 8-12,—Cultivated in gardens with a double flower.


**Hab.** Moist meadows, ditch and stream-sides, very frequent. July, August. 7.

Meadow-sweet.—Stems 3-4 feet high, furrowed. *Leaves* dark green, pinnate, the leaflets more or less ovate-acute, unequally serrate, terminal one mostly 3-lobed, with very small intermediate ones, beneath clothed with a white down. *Stipules* roundish, toothed. *Flowers* crowded, yellowish-white, cymose, 2 lateral branches usually rising in a prolific manner above the first cyme; odour strong, agreeable. *Styles* 6-8.
III. POLYGYNIA.

5. ROSA *.

* Pimpinellifolia. Setigerous, with subuniform crowded arms, or unarmed; very rarely with bracteas. Leaflets ovate or oblong. Segments of the calyx connivent, persistent. Disk almost none.


Hab. Dry pastures, especially near the sea, and waste places. By Duddingston Loch, on the hill side, Lightfoot. Links near Cockenzie, with the petals red at the base (R. ciphiana, Sibbald), Maughan. Hills above N. Queensferry, and road-sides between Duddingston and Musselburgh. June. 12.

Burnet Rose.—A dwarf, compact, dark (sometimes reddish) green bush, with creeping roots. Branches short, stiff, much divided, beset by very dense, unequal prickles or setæ; some of the former being usually falcate. Leaves close together, quite free from pubescence; stipules either narrow or dilated, of nearly equal breadth; petals setigerous and prickly; leaflets about 7, bright green, flat, simply serrated, orbicular or nearly so. Flowers solitary, without bracteas, calyctiform, blush-coloured; peduncles naked, or rough with glands or setæ, as are the calyctine segments, which are short and entire; tube ovate, or nearly round, naked; petals emargi-

* In this most beautiful and most difficult genus, I feel that I cannot do better than follow the example of my friend Dr Hooker, and quote the words of Mr Lindley, who has assuredly done more to elucidate the Roses than any preceding botanist. I shall even give his divisions at length; for I conceive every assistance to be of importance to the student.

The following parts must be explained in Mr Lindley's own words:

"Arms is a term used to express the presence of setæ and prickles, mixed indiscriminately."

"Setæ or bristles are little straight prickles (aculei) tipped with a gland. They are known from real glands by their rigidity, greater length, and tendency to pass into prickles. They exist at some period, I believe, in all species upon the root-shoots, where they are quickly changed into prickles, by losing their gland. On their presence on the branches depend some of my most natural divisions." Mr Lindley finds important characters in their form and inequality.

"Glands which are perhaps better distinguished from setæ by their scent than any thing else, are for the most part attached to the leaves on the under surface."

"Pubescence on the branches, peduncles or tube of the calyx, is the only invariable character I have discovered in Roses; but just the reverse is the case with pubescence upon the leaves."

"The shape of the sepals (calyctine segments) may sometimes be considered, but very rarely, their degree of division."

"Distinctions drawn from the shape of the tube of the calyx, can in no instance be employed. All varieties of form may be found in canina and tomentosa."
nate, concave; disk not thickened; styles villous, distinct. Fruit ovate or nearly round, black or dark purple, crowned by the connivent or somewhat spreading segments of the calyx.—\textit{Lindl.}


\textit{Hab.} Thickets and mountainous places. \textit{b.} Banks of the Water of Leith, near Colinton, Mr Borrer. June. \textit{f2}.

\textit{Sabine’s Rose}.—Shrub 8-10 feet high. Branches erect, stout, dark brown, armed with distant falcate prickles, and a few setae (bristles). Leaves grey, distant; stipules narrow, fringed with glands; petiols downy, glan- dular, armed with little prickles; leaflets 5-7, oval, doubly serrate, flat, hairy on both sides, a little glandular beneath. Flowers usually solitary, sometimes in great bunches; peduncles and calyx very hispid; the tube round; calyceine segments compound. Fruit round, scarlet, hispid with bristles.—Can this be after all a production of \textit{R. tomentosa mollis}?—\textit{Lindl.}

**Villose.** Root-shoots straight. Prickles nearly so. Leaf-lets ovate or oblong, with diverging serratures. Calyceine segments connivent, persistent. Disk incrassated, closing the mouth.


\textit{Downy-leaved Dog Rose}.—Seven or eight feet high, spreading, very grey. Branches somewhat glaucous, armed with straight (rarely falcate), equal, scattered prickles, and without bristles. Leaves hoary with down; stipules concave, dilated, somewhat toothed, and fringed with glands; petiols slightly prickly and glandular; leaflets about 5, oblong or ovate, obtuse, doubly serrate; serratures diverging, rarely converging; soft and rugose, paler beneath, and sometimes slightly glandular, when bruised having a turpentine smell. Flowers 1 or more, reddish, or cup-shaped, with short stalks; bracteas ovate or oblong, downy, longer or shorter than the peduncles, which are hispid with unequal bristles and glands; tube of the calyx ovate, oblong or round, usually hispid, sometimes nearly smooth; calyceine segments compound, spreading, always hispid at the back; petals entire, obcordate, concave; disk thickened, flat; styles very hairy, distinct. Fruit somewhat purple, round or obovate, or depressed, usually hispid, crowned by the converging calyceine segments; but these sometimes fall off immediately after the fruit is ripe.—\textit{Lindl.}


5. inodora, prickles much hooked, nearly equal; leaflets less glandular; calycine segments deciduous before maturity. R. dumetorum, E. B. t. 2579.


Sweet-brier.—Much branched, 3–4 feet high, with a more compact habit than R. canina. Branches bright green, flexuose, armed with numerous, hooked, unequal, scattered, strong prickles; on the root-shoots sometimes very small, and tipped with a gland. Leaves dull, rugose, green, very sweet scented, covered beneath with numerous brown glands; stipules dilated, minutely toothed, hairy beneath; petals with a few strong, unequal prickles, somewhat spoon-shaped, usually naked above, covered with hairs, and very pale and rugose beneath. Flowers 1–3 together, concave, pale blush; bracteas pale, lanceolate, acute, concave, slightly hairy and glandular; peduncles and calyx hispid, with weak bristles; tube ovate; calycine segments reflexed, pinnate; petals obcordate; disk much thickened; germens 20–30; styles hoary, distinct. Fruit orange-red, roundish, oblong or obovate, hispid or smooth; crowned by the ascending calycine segments.—Lindl.

**** Canina. Prickles equal, hooked. Leaflets ovate, not glandulose, the serratures connivent. Calycine segments deciduous. Disk incrassated, closing the mouth. Larger shoots curved.


Dog Rose.—A straggling brier 6–7 feet high. The branches bright green, reddish brown on the sunny side, armed with strong, scattered, hooked, nearly equal prickles (rarely straight and then much closer together), and no bristles. Leaves distant, pale or dark green, often tinged with red, in exposed situations usually much blistered by the sun, quite free from pubescence; stipules rather dilated, a little reflexed, acute-pointed; petals armed with a few, little, hooked prickles; leaflets 5–7, ovate or oblong, acute or rounded, sessile or subsessile, flat or concave, even or rugose, coarsely or finely, simply or doubly serrated, the serratures always acute, without glands, and converging. Cymes one or many-flowered; bracteas ovate-lanceolate, appressed, acute, concave or flattish, finely
toothed and glandular at the edge; peduncles and calyx smooth; tube ovate; calycine segments spreading, sharp-pointed, deciduous, somewhat divided; petals obcordate, concave; disk very thick, elevated; germens 20–30; styles nearly smooth, distinct, included or a little exserted. Fruit ovate or oblong, scarlet, shining, without any bloom; pericarps large, uneven.—Lindl.

***** SYSTILE. Styles cohering in a lengthened column. Stipules adnate.


Hab. Hedges and thickets, not common. King's Park, Mr Neill. June, July. ½.

White Field Rose.—Branches flagelliform, procumbent, slender, dull glaucous purple, armed with scattered, falcate, or straightish, equal prickles, those of the old shoots almost white, of the young ones smaller and reddish, sometimes none (in weak specimens). Leaves distant, dark green, or, on a chalky soil, yellowish; stipules narrow, flat, naked, fringed with glands, red in the middle; petiols pubescent, with scattered glands, and little falcate, dorsal prickles; leaflets 5–7, flat, ovate, somewhat waved, simply serrate, very glaucous beneath, the rib somewhat hairy. Flowers solitary on the branchlets; numerous on the root-shoots, white, with a yellow base and slight scent, at first cyathiform, afterwards more open; peduncles rough with glands, and a very few bristles; tube of the calyx ovate, naked; calycine segments short, ovate, concave, a little divided, those which are so, rough with glands; petals obovate, emarginate; stamens persistent; disk elevated, fleshy; pericarps 15–25; styles united into a long smooth column. Fruit scarlet, round or oblong.—Lindl.

6. RUBUS.
(Nat. Ord. Rosaceæ, Hook. Scot. 2. p. 263.)


Raspberry.—Stems rather shrubby, numerous, 2–4 feet high, rounded, varying in their degree of hispidity. Leaves subovate, cut and serrate; petiols pubescent, with scattered prickles. Flowers drooping, paniced, white. Petals small, plane. Fruit crimson, rendered setose from the permanent styles.—Fruit in regular request for the table.


Dev-berry.—Stems prostrate, trailing, remarkably glaucous, not very woody. Leaflets not white beneath, but hairy, doubly serrate, the lateral ones
with several lobes. Flowers in prickly, few-flowered, terminal panicles. Petals white or pinkish, waved, roundish, obovate. Fruit rather large, few-grained, black, with a blue bloom, acid, agreeable.


**Hazel-leaved Bramble.**—Stems very long, curved and trailing, fragile, rounded, with the prickles scattered and straightish. Leaves irregularly cut and serrate; the lateral leaflets sub sessile. Flowers panicled, white. Petals waved, concave. Fruit dark or blackish violet, hemispherical, the grains large. Calyx reflexed after flowering.


**Hab.** Woods and hedges, very common. July. 7.

**Common Bramble.**—Stems much like the preceding, but stouter and not brittle, also obtusely angular, and having strong hooked prickles on the angles only, which is the best constant specific distinction between this and the last. Leaflets shortly petiolate, and somewhat attenuate at the base. Flowers numerous, panicled. Petals mostly tinged with pink. Fruit roundish, blackish purple, of many rather small grains.


**Stone Bramble.**—Stems slender, 8–12 inches high, erect, somewhat hairy, without prickles, or with a very few weak ones, producing 2 or 3 leaves on longish petioles. Leaflets broadly ovate, doubly serrate. Panicle 2–5 flowered. Calyx spreading, segments lanceolate. Petals very small, mostly erect, white. Fruit fine red, of a few large distinct grains or clustered drupes, 2–5 together.


**Hab.** Banks on the mountains. Top of the eastern Cairn Hill, one of the Pentlands, Messrs Sommerville and E. Maughan. July. 7.

**Cloudberry.**—Root creeping. Stems 6–10 inches high, slender, bearing 2 or 3 roundish, plicate, lobed, and serrate leaves. Flower large, white. Calyx with ovate segments. Fruit orange, a cluster of large sub distinct grains or drupes. Taste agreeable.

7. **FRAGARIA.**

(Nat. Ord. Rosaceæ, Hook. Scot. 2. p. 263.)

1. F. vesca, root with creeping scions; hairs of the pedicels...
ICOSANDRIA. POLYGYNIA. POTENTILLA.


HAB. Woods and banks, common. May—July. ¥.

Wood Strawberry.—Root throwing out long runners above ground, which radicate at intervals, and produce new plants. Leaves radical, or nearly so, ternate, pubescent beneath. Scape 3–8 inches high, bracteate. Flowers in a panicle, white, erect. Fruit drooping, ovate, red, pulpy, studded with the small smooth pericarps.—F. elatior is distinguished by the pedicels being covered with abundant patent hairs.

8. POTENTILLA.

(Nat. Ord. Rosaceæ, Hook. Scot. 2. p. 263.)

* Leaves ternate.


HAB. Woods and banks, very common. March, April. ¥.

Barren Strawberry.—Plant 2 or 3 inches high. Flowering stems slender, 1 or 2-leaved, bearing 1–3 white flowers on pedicels. Pericarps not accompanied by a pulpy fruit, rugose.


HAB. Dry heathy pastures, very common. June, July. ¥.

Common Tormentil.—Root large, woody. Stems 6–12 inches long, numerous, slender, branched dichotomously. Leaves all sessile, somewhat hairy. Stipules deeply cleft, making the leaves appear quinate at first sight. Flowers on long pedicels, axillary, and terminal, small, golden yellow. Petals mostly 4, and calyxine segments 8; but sometimes 5, and the latter 10.

** Leaves digitate.


HAB. Barren stony pastures, rare. Craig Brae, near Dundas Castle, Mr Falconer. Blackford Hill and Binny-craig, Maughan. June. ¥.

Hoary Cinquefoil.—Stems spreading, 6–12 inches long, whitish and tomen-

* It is not any desire of innovation that induces me to exclude the genus Tormentilla. It may truly be said of the two species, that they are wholly Potentilla in habit, and in every other respect, save the number of the caly- cine segments and petals; and these are not unfrequently of the proper number to make them Potentilla. Sir J. E. Smith remarks, that T. reptans has sometimes 5 petals in the beginning of its flowering; a fact which seems to indicate one of those anomalies which sometimes occur, but cannot be actually sufficient to remove a plant from so strong a natural affinity.
tose, slightly branched. Leaflets sometimes rather cleft than serrate. Flowers in irregular corymbose panicles, numerous, small, yellow.


Spring Cinquefoil.—Stems decumbent, 3–6 inches long, branched. Leaves on longish petiols, glabrous above, pubescent beneath, and at the margin sharply serrate, but the serratures obtuse; cauline ones ternate. "Flowers at the end of weak leafy branches, 2 or 3 together, on long footstalks, bright yellow," Hook.


Hab. Borders of fields and waste places. Near Kirkcaldy, Mr Stewart. June, July. 𐐊.

Procumbent Cinquefoil.—Stems few, prostrate, 12–20 inches long, not rooting. Leaves on long petiols, hairy; cauline ones ternate, sessile. Flowers golden yellow, on slender branches and longish peduncles. Petals 4, broadly obcordate. Calycine segments 8. Not unfrequently the petals are 5, and the calycine segments 10.


Hab. Fields and road-sides. Links and road-sides east of Musselburgh, Mr Arnott. Road leading up to Craigmillar Castle, immediately after leaving the main road to Dalkeith by Prestonfield, Mr Neill. June, August. 𐐊.

Common Creeping Cinquefoil.—Stems slender, long, resembling runners, radiating at the joints, and throwing up from the same point a few leaves and flower-stalks, the petiols of the one and peduncles of the other being long, erect, 2–6 inches in length. Flowers large, deep yellow.—Under a wall in a shaded situation I have seen the running stems 4 feet long.

*** Leaves pinnate.


Hab. Moist meadows and road-sides, very common. June, July. 𐐊.

Silverweed.—Stems prostrate, radiating at the joints, and throwing up leaves and a solitary peduncle from the same point. The degree of silkiness varies. Flowers large, handsome, delicate yellow.
9. GEUM.
(Nat. Ord. Rosaceæ, Hook. Scot. 2. p. 262.)


Hab. Woods and hedges, very common. May—August. 1l.

Common Aven.—Stems 1—2 feet high, branched upwards. Radical leaves on long petiols, with the terminal leaflet very large, the lateral ones minute; cauline ones sessile. Flowers terminal, solitary, on longish erect peduncles, yellow. Petals patent, roundish, mostly shorter and rarely longer than the calyx. Awns of the fruit hooked.


Water Aven.—Stems about a foot high, slightly branched upwards, hairy. Radical leaves lyrate, the size and shape of the leaflets varying, the terminal one the largest; cauline ones ternate or simple. Flowers on long nodding, reddish peduncles. Calyx large, reddish or purplish, campanulate. Petals erect, obcordate, with a longish claw, pinkish orange. Awns plumose, hooked.—Flowers sometimes yellow, and resembling a hybrid between the two. This has been found by Mr Maughan in Colinton woods; and by Dr Graham on the banks of the Esk above Newbattle. A variety with double flowers occurs also in a wild state, and has been found by Mr Neill by the Water of Leith in several places.

10. COMARUM.
(Nat. Ord. Rosaceæ, Hook. Scot. 2. p. 264.)

1. C. palustre.

Hab. Bogs and marshes, frequent. Duddingston Loch; Braid Hill marshes; Pentland Hills, &c. July. 1l.

Marsh Cinquefoil.—Root creeping. Stems ascending, 6—12 inches long, branched, smooth. Lower leaves petiolate, pinnate; leaflets 5—7, lanceolate, serrate, smooth, very rarely villose; upper ones sessile, quinate or ternate, with a pair of stipules at their base. Flowers few, terminal, in a sort of panicle, dark purple. Calyx large, spreading, with alternate large and small segments. Petals minute, acute, purple. Fruit conico-hemispherical, spongy, not deciduous, the pericarp partly imbedded as in Fragaria; the surface setose with the permanent styles.—The variety with villose leaves I have found in a bog above North Queensferry.
XIII. POLYANDRIA.

I. MONOGYNIA.

1. CHELIDONIUM.


Hab. Waste places. Ruins of Corstorphine Castle, Mr Neill. Between the eight-mile stone and Cockenzie on the Haddington road from Edinburgh, Mr Arnott. May, June. ♀.

Celadine.—Plant full of an orange juice. Stems 1–2 feet high, branched, rounded, hairy. Leaves pinnate; leaflets mostly 5, decurrent, broadly ovate, more or less lobed, and obtusely crenato-serrate, very glaucous beneath. Flowers yellow, in long, pedunculate, axillary umbels. Calyx deciduous. Petals 4, delicate. Pod long, somewhat turgid.—Juice used to destroy warts.

2. GLAUCIUM.


Yellow Horned-Poppy.—Plant spreading, very glaucous. Stems 1–3 feet long, decumbent, ascending at the ends. Radical leaves lyrato-pinnatifid, long, scabrous. Flowers large, bright yellow, numerous. Pod elongated after flowering, 6–12 inches.—Foetid and poisonous.

3. PAPAVER.


* Capsules hispid.


** Capsules glabrous.

2. P. dubium, capsules glabrous, oblong; stem many-flowered,

Hab. Corn-fields and waste ground. King's Park, Mr Bainbridge. Frequent in fields round Edinburgh. July. Ø.

Long Smooth-headed Poppy.—Plant hairy; hairs of the stem spreading, those of the flower-stalks closely appressed. Stem 2 feet high, slightly branched. Leaves with broader segments than the preceding. Flowers larger, scarlet. Petals broad, irregularly crenate. Stamens linear.


Hab. Corn-fields, very common. June, July. Ø.

Common Red Poppy.—About the same size as the last, and sufficiently distinguished by the hairs being patent on the peduncles as well as the stem, and by the short roundish capsule. Flowers large, deep red. Petals very broad.—A troublesome weed in corn-fields.


Hab. Moist woods, rare. Banks of the Water of Leith, near Woodhall, Messrs Sommerville and Maughan. Braid woods, Mr Arnott. June, August. Ø.

Yellow Poppy.—Stems 12–18 inches high, leafy, branched. Leaves large, the leaflets ovato-lanceolate, a good deal lobed, and obtusely cut, tender, pale green, glaucous beneath. Flowers yellow. Petals roundish, delicate.


Hab. Lakes and ponds. Lochend, Maughan. July. Ø.

White Water-Lily.—Plant growing in the water. Leaves on long petioles, floating, large. Flowers very large, magnificent, white. Calyxine leaves somewhat longer than the petals, white within. Petals numerous, gradually diminishing in size towards the centre, and passing into stamens, which, as well as the petals, are inserted upon the germin. The latter decays without opening.

5. Nuphar.


Hab. Lakes and ponds. Lochend, Maughan. July. Ø.

Yellow Water-Lily.—Leaves large, floating, on long petioles. Flowers large, deep yellow. Calyxine leaves large, roundish, yellow, very concave. Pe-
Aquilégia. Polyandria. Pentagynia. 121

tals numerous, small, obtuse, fleshy, orange. Stamens and anthers recurved, numerous, the outer ones somewhat the largest. Fruit "flagon-shaped," (Hook), large, terminating in the flat, dilated stigma. Seeds numerous, large.—Flowers smelling like brandy.

6. Tilia.


Lime or Linden-tree.—A handsome, large tree, with a smooth bark, the young branches mostly reddish. Leaves numerous, petiolate, glabrous, veined. Flowers small, greenish, in drooping pedunculate umbels or cymes, which arise from the centre of a long, lanceolate, foliaceous bractea, of a pale yellowish green colour, and deciduous with the fruit, which is 1-celled and 1-seeded.—Flowers very fragrant.

7. Helianthemum.


Common Dwarf-Cistus.—Stems several from the same root, rather slender, 3-6 inches long. Leaves opposite, oblance or elliptic-oblong, shortly petiolate, variable in regard to the breadth, the degree of hairiness, and revolution of the margin. Flowers delicate, yellow, in terminal racemes, the petals very deciduous. Calyx of 3 large and 2 small leaves.—This plant, in common with a large group, varies from the true Cistis in having a 1-locular 3-valved capsule; assuredly sufficient to constitute a good genus. I perfectly agree with Dr Hooker in regarding C. tomentosus as the same plant we have described.

II. Pentagynia.

8. Aquilegia.
(Nat. Ord. Ranunculacae, * Juss.)


Hab. Woods and moist pastures. Colinton woods, Dr Parsons in Lightfoot. June. ½.

* This genus is omitted in the 2d part of Dr Hooker's Flora Scotica.
Common Columbine.—Stems 1–2 feet high, branched, leafy. Leaves bi-ter-nate, petiolate; leaflets irregular in form, more or less divided into ob-tuse, roundish lobes, glaucous beneath; cauline ones sessile. Flowers large, drooping, pedunculate. Calyxine leaves 5, purple, large, erect. Petals 5, purple, passing into large, hollow, spurred nectaries, which protrude between the leaves of the calyx.—Liable to many variations in the colour of the flower, characters of the leaves, &c.

III. HEXAGYNIA.

9. STRATIOTES.


Water Soldier.—Plant growing in water, and striking long roots and runners into the mud, the latter throwing up young plants to succeed the old ones, which flower but once. Leaves resembling those of an Aloe, as both Smith and Hooker have observed, arranged also in the same manner, all arising from the base; they are rigid, 6–9 inches long, linear-lanceolate, and edged with very prickly serratures. Flower white, solitary, large, produced on a scape, and issuing from a 2-leaved spatha. Petals 3, rounded, concave. Stamens with subulate anthers. Styles mostly 6.—Flowers said to be sometimes dioecious.

IV. POLYGYNIA.

10. ANEMONE.

(Nat. Ord. Ranunculaceæ, Hook. Scot. 2. p. 294.)


Hab. Woods, brakes, and moist pastures, very common. April, June. 7.

Wood Anemone.—Root black, somewhat tuberous. Plant 6–8 inches high. Leaves glabrous or subpilose, on long petiols. Involucre within 2 inches of the flower, large, of 3 petiolate leaves. Flower solitary, pedunculate, large, whitish, tinged on the outside with pink or purple.

11. CLEMATIS.

(Nat. Ord. Ranunculaceæ, Hook. Scot. 2. p. 293.)


Hab. Woods and hedges. Colinton woods, Maughan, (certainly not truly wild.) May, June. 7.

Travellers’ Joy.—Stems sarmentose, very long, much entangled, climbing by means of the twisting petiols, which act as tendrils, and do not fall
Thalictrum. Polyandria. Polygynia. 123

with the leaves. Leaves opposite, spreading; leaflets variable in the lobes and serratures, rarely entire. Flowers in axillary panicles, white, sweet-scented. Capsules with long feathery awns, very conspicuous.

12. Thalictrum.

(Nat. Ord. Ranunculaceæ, Hook. Scot. 2. p. 294.)


Hab. Hilly pastures, and downs by the sea-side. Between Carolina Park and Cramond, G. Don. Coast west of Kirkcaldy, Messrs Arnot and Greville, plentiful in both stations. June, July. *.

Lesser Meadow-Rue.—Stem about a foot high, somewhat flexuose and branched in a divaricate manner, covered with a glaucous bloom. Leaves spreading; leaflets small, varying in form, with 3-5 obtuse teeth at the apex, which is sometimes so truncate as to render the shape cuneiform. Flowers with a 4-leaved perianth.

2. T. majus, stem glaucous towards the base; leaves tripinnate, leaflets glabrous, glaucous beneath, lobed and toothed, the main lobes and teeth ovate, acute; flowers in large panicles, drooping; "pericarps obliquely rounded at the base;" DC. Hook. Fl. Scot. p. 172. ? Smith, Fl. Brit. p. 585. ? E. B. t. 611. ?


Greater Meadow-Rue.—Stem 2 feet high or more, flexuose, glaucous towards the base, much branched upwards; branches divaricate. Leaves twice or thrice as large as the preceding; leaflets often lobed, sometimes only toothed, lobes mostly trifid; when there are only teeth, there are 3-5; teeth and lobes, especially the center ones, acute, mostly so in the uppermost leaves. Besides the glaucous hue beneath, there is also a metallic, or bronze-like effect, produced by very minute glands? which is not present in the minus. This is very strong in my dried specimens, and probably is also to be seen in living ones.

I have drawn up the above description from the North Queensferry plant, but will not venture to decide that it is the majus of many authors; of E. B. I think surely not. It differs from Decandolle's in having a glaucous bloom on the lower part of the stem; but it agrees in the lobules of the upper leaflets being submucronate, at least the margin at each side the summit is slightly revolute, so as to produce the effect. The same author's distinction, drawn from the pericarps, I have not been able to confirm, my specimens not being sufficiently advanced *.

13. Ranunculus.

(Nat. Ord. Ranunculaceæ, Hook. Scot. 2. p. 294.)

* Petals white, with a yellow claw, and a nectiferous pore at the base.

1. R. aquatilis, stem floating; submersed leaves, capillacco-

* Th. flavum is inserted in Lightfoot as growing near North Queensferry, on the authority of Dr Parsons. There is no doubt Th. majus was mistaken for it.

\( \beta \). All the leaves submersed, divided into capillary diverging segments, forming a small orbicular outline. *R. pantothen*.

\( \alpha \). *Decand. Syst. Veg.* 1. p. 235.

\( \gamma \). All the leaves submersed, divided into long capillary segments. *R. pantothen*, \( \gamma \). *Decand. l. c. p. 236.

**Hab.** In shallow ponds and ditches, very common. \( \beta \) and \( \gamma \) in Duddingston Loch. May, June. \( \gamma \).

*Water Crowfoot.*—Stems varying in length, according to the depth of the water, branched. Leaves, when floating, varying in the form of their 3 lobes, and when submersed, in the length and compactness of their capillary segments, which are more or less divided. *Flowers* mostly large, lively. *Petals* varying in size, but always larger than the calyx, claw always yellow. *Pericarps* more or less hispid, rarely, yet sometimes glabrous, when mature.—Dr Hooker's observations in Flora Scotiae are very just on this species. *R. pantothen* and *tripartitus* of Decandolle seem to be mere varieties. Nearly allied to this, also, is *R. multifidus*, Ph., but it has yellow flowers; and equally near is the *R. lacustris* of Dr Beck, though a remarkable plant.


**Hab.** Ditches and marshy places, occasionally under water. Road-side near Mordun, Mr D. Stuart. King's Park, Mr Arnott. Summer. \( \gamma \)

*Ivy-leaved Crowfoot.*—Stems short, striking numerous roots. Leaves many, petiolate, smooth, rather fleshy. *Flowers* axillary, very small, on short peduncles; the petals narrow, a little longer than the calyx. *Pericarps* glabrous.

**Flowers yellow; petals with a nectiferous scale at the base.**

\( \dagger \) *Leaves undivided.*


**Hab.** Bogs and marshy places, very frequent. King's Park, &c. July, August. \( \gamma \).

*Lesser Spearwort.*—Stems 6–18 inches long, somewhat branched, scarcely decumbent at the base, when strong and crowded by other plants, but sometimes weak, and quite procumbent. Leaves subseriate, or nearly entire, *radical* ones linear-ovate, petiolate. *Flowers* much smaller than in the following, which the whole resembles on a smaller scale. *Pericarps* smooth.—*R. repans* of Lightfoot, figured by him in the title-page to vol. 1. of his Flora, is a var. of this species. A powerful and speedy emetic.
Ranunculus. Polyandria. Polygynia. 125


HAB. Ditches, lake-sides. Duddingston Loch, Dr Parsons in Lightfoot. (Chiefly var. β) July ½.

**Great Spearwort.**—Stems 3-4 feet high, quite erect, stout, succulent, smooth or hairy, branched; branches erect. Leaves very long, linear-lanceolate, acuminate, sub serrate or entire, serratures distant. Flowers large, very handsome.

†† Leaves variously divided.

+ Pericarps smooth. Root perennial.
nearly glabrous, not deflexed. Flowers golden yellow, shining. Pericarps terminated by a nearly straight point.—Plant acrid. Very dwarf on the mountains, and 1-flowered.


Creeping Crowfoot.—Plant increasing by runners, which take root and throw up new plants. Flowering stems erect, 1-2 feet high. Leaves ternate; the two lateral leaflets on very short foot-stalks, trifid; the central one on a longer foot-stalk, 3-lobed, the lobes trifid; all more or less cut; uppermost stem-leaves entire. Calyx pilose, not deflexed.


Bulbous Crowfoot.—Root bulbous. Stem 6 inches—2 feet high, somewhat branched, hairy. Leaves more or less hairy; terminal lobes of the lower ones subovate. Upper leaves sessile, cleft into linear segments. Peduncles furrowed. Calyx reflexed, hairy.—Plant acrid.

++ Pericarps tuberculate or muricate. Root annual.


Pale Hairy Crowfoot. Root fibrous. Stem 3—12 inches high, erect, branched, hairy; hairs spreading. Radical leaves rather small, pale, hairy; cauline ones more or less cut into linear segments. Peduncles furrowed, hairy. Calyx reflexed, hairy; "hairs glandular at the base." (Sm.)


Corn Crowfoot.—Stem 12—18 inches high, much branched; the uppermost branches and peduncles subvillose. Segments of all the leaves more or less linear; glabrous. Flowers small. Petals obovate, narrow. Pericarps large, compressed, few, very muricate.—Plant very acrid, even poisonous.

14. FICARIA.


1. F. ranunculoïdes, root composed of numerous small tu-

HAB. Hedge banks, woods and borders of fields, very common. April, May. ².

Pilewort. Root of several pyriform whitish tubers, with others often scarcely larger than grains of wheat. Stem 3-6 inches high, glabrous, succulent, leafy, 1-flowered. Leaves shining, very smooth, somewhat fleshy, cordate, angulato-crenate. Calyx 3, rarely 5-leaved. Petals elliptical, 8-12, greenish on the outside before expansion.

15. TROLLIUS.


HAB. Moist meadows and thickets. Banks of the Water of Leith, opposite Newmill, above Currie; Meadow-ground south of Ravelrig-toll; near Borthwick Castle, Maughan. Lugton woods, Mr Neill. Woods at Mid-Calder, Dr Macdonald.

Globe-flower.—Stems several, 1-2 feet high, branched upwards. Leaves smooth, dark green, 5-partite, the lobes variously divided and cut; the radical ones on long petioles. Flowers large, very handsome, golden yellow, almost globular from the roundish connivent leaves of the calyx. Petals linear.—I have followed Decandolle and Hooker in considering the corolla of Smith as the calyx; and his nectaries as petals.

16. CALTHA.
(Nat. Ord. Ranunculaceae, Hook. Scot. 2. p. 296.)


β. Stem decumbent, radicating at the lower joints; leaves cordato-triangular. C. radicans, E. B. 2175.

HAB. Marshy meadows and wet places, very common. β. Very abundant on the Pentland Hills. May, June. ².

Marsh Marigold.—Stems 3-18 inches high, stout, succulent, glabrous, succulent, slightly branched. Leaves large, shining, glabrous, cordate, rounded; those of the stem sessile, smaller, and acutely crenate. Flowers large, pedunculate, fine deep yellow. Perianth 5-leaved. Stamens very numerous.—Cultivated in gardens with double flowers.

17. HELLEBORUS.
(Nat. Ord. Ranunculaceae, Hook. Scot. 2. p. 296.)


HAB. Pastures and thickets. Between Anstruther and Kepply, Mr Chalmers. April. ².

Stinking Hellebore.—A bushy glabrous plant, 2 feet high. Stems stout, pale,
branched. *Leaves* very dark green, on long petiols; the upper ones entire, with a broad pale membranaceous base. *Flowers* panicled, numerous, pale green. *Calyx* large, tinged with purple at the apex. *Petals* very minute, tubular, terminating in a nectiferous base. *Styles* 3-4. Fœtid and acrid.

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### XIV. DIDYNAMIA.

#### I. GYMNOSPERMIA.

1. **AJUGA.**

*(Nat. Ord. Labiat.e, Hook. Scot. 2. p. 214.)*


*Common Bugle.*—Flowering-stem solitary, erect, 4-angled, 6-12 inches high, purplish. *Leaves* opposite, shining, subovate; *lower* ones attenuated into a petiol; *upper* ones sessile. *Flowers* pale blue, whorled, axillary; the whorls and leaves becoming crowded towards the top. *Calyx* hairy. *Corolla* with the lower lip 4-lobed.—Whole plant generally tinged with purple.

2. **TEUCRIUM.**

*(Nat. Ord. Labiat.e, Hook. Scot. 2. p. 215.)*


*Hab.* Heaths, dry woods, and stony thickets. King’s Park, Mr Yalden. Rosslyn woods, &c. *July, August.* ¥.


3. **MENTHA.**

*(Nat. Ord. Labiat.e, Hook. Scot. 2. p. 215.)*

*Flowers* in a spike.

1. *M. piperita,* spikes obtuse, interrupted below; leaves ovate, subglabrous, petiolate; calyx very smooth at the base, (Sm.) *E. B. t.* 687. *Fl. Brit.* p. 613.


*Peppermint.*—“Stem erect, branched, a little hairy with recurved hairs, often purplish. *Leaves* petiolate, dark green, ovate, somewhat acute, serrate, smoothish above, more or less hairy beneath, never downy. *Lowest whorl of flowers* remote, sometimes spiked. *Flower-stalks* either quite smooth, or a little hairy upwards. *Calyx* slender, furrowed, dotted, the
Mentha. Didynamia. Gymnospermia. 129

teeth dark purple, and fringed. Corolla purplish. Stamens shorter than the segments;" Smith.—Leaves vary in form on one side to ovate-lanceolate, on the other to cordate-ovate.

** Flowers capitate or whorled.


Hab. Ditch and pond-sides; marshy places, very common. Duddingston Loch, several varieties. August, September. 2.

Hairy Water-mint.—Root creeping, throwing up many stems. Stems 1 to nearly 3 feet high, 4-angled, mostly purplish, varying as well as the leaves in the degree of hairiness. Hairs of the petioles spreading. Flowers sometimes all capitate or all whorled, or both on the same individual, lilac-coloured, numerous. Calyx and peduncles mostly very hairy. Stamens usually longer than the corolla.—I have seen the flowers vary so much from whorled to capitate, and vice versa, that no dependence can be placed on the latter character.


Hab. Banks of streams and ditches, rare. Musselburgh, Mr Borrer. September. 2.

Tall red Mint.—Stem 3-5 feet high, flexuose, reddish, glabrous. Leaves petiolate, broadly ovate, "dark shining green, upper ones small and ovate." Whorls of flowers numerous; flowers reddish, rather large. Bracteas linear, ciliate. Calyx "somewhat campanulate, dotted with resinous glands, its teeth always more or less hairy;" Smith. The stamens are inconstant in their length.


Hab. Corn-fields in damp sandy or gravelly soils, frequent. Corn-fields about Craighrook; and near Colinton. August, September. 2.

Corn-Mint.—Root creeping. Stem 3-12 inches high, more or less branched or simple. Leaves shortly petiolate, varying in form from cordate to ovate or elliptical, hairy. Whorls of flowers, almost quite sessile. Calyx campanulate, and bristly with spreading hairs, the chief distinctive character.—Plant with a disagreeable smell, often closely resembling that of mouldy cheese.


I
DIDYNAMIA. GYMNOSPERMIA. GLECHOMA.

Pennyroyal.—Root creeping. Stems prostrate, throwing up erect flowering ones, 6-9 inches high, slender. Leaves ovate or roundish ovate, very slightly serrate, often recurved. Whorls of flowers numerous, pale lilac. Flower-stalks and calyx clothed with downy soft hairs. Scent very strong. —Lightfoot's station is very suspicious.

4. GLECHOMA.
(Nat. Ord. Labiate, Hook. Scot. 2. p. 215.)


Hab. Hedges and waste places, common. King's Park, Mr Yalden. April, May. y.

Ground Ivy.—Root very creeping. Stems a foot long, decumbent, 4-angled. Leaves petiolate, crenate, hairy, very veiny. Flowers axillary, in threes, fine blue. Lower lip of the corolla 4-lobed; lobes roundish.—Plant with a very powerful smell when bruised, agreeable to some people.

5. LAMIUM.
(Nat. Ord. Labiate, Hook. Scot. 2. p. 216.)


Hab. Hedges, road-sides and waste places, frequent. King's Park, Mr Yalden. June, July. y.

White Dead-Nettle.—Root creeping. Stem erect, 1-2 feet high, 4-angled, hairy. Leaves large, hairy, spreading, opposite, on short petiols. Flowers axillary, large, yellowish-white, erect, hairy. Stamens with black anthers within the hood of the corolla.


Hab. Hedges, fields and waste places, abundant. May—September. O.

Red Dead-Nettle.—Stems erect, or decumbent, subglabrous, branched at the base, 6-12 inches high, 4-angled. Leaves hairy, the upper ones crowded, and shortly petiolate, the lower ones remote and on longer petiols. Flowers purplish, rarely white. Anthers reddish.—It varies with white flowers, and rarely with nearly entire leaves.


Hab. Fields and road-sides. Fields near Newhaven; and road-side between Merchiston Castle and Colinton. May, June. O.

Cut-leaved Dead-Nettle.—Stem 6-9 inches high, branched at the base, where it is also somewhat decumbent, sub-glabrous. Leaves cordate, widely triangular, quite plane, pubescent, often somewhat lobed, cut, lower ones on longish petiols, the upper ones on very short ones. Flowers fine reddish-purple. Calyx very hairy.—Certainly distinct from the preceding.

4. L. amplexicaule, floral leaves broadly cordate, sessile, am-
Galeopsis. Didynamia. Gymnospermia. 131


Hab. Fields, road-sides, and waste places. King's Park, Mr Yalden. Roadsides between Merchiston Castle and Colinton. April—June. O.

Hen-bit Dead-Nettle.—Smaller than any of the preceding in the size of its leaves and flowers. Stems slender, suberect, 6-12 inches high. Flowers fine carmine-red, some with a long, slender, pale tube, and opening, others scarcely protruded beyond the calyx, and never expanding, yet fertile.


(Nat. Ord. Labiat.e, Hook. Scot. 2. p. 216.)


Hab. Dry stony places, rare. Road-side near Oxenford Castle; and at Crossgate toll, Maughan. September, October. O.

Red Hemp-Nettle.—Stem about a foot high, 4-angled, with opposite branches, purplish. Leaves rather small, very shortly petiolate, hairy above, the veins beneath villose. Calyx hairy, with macrate teeth. Flowers whorled. Corolla rose-colour, with a longish tube.


Hab. Corn-fields and waste places, frequent. King's Park, Mr Yalden. August. O.

Common Hemp-Nettle.—Stem 1-2 feet high, very hispid, branched, 4-angled, swollen beneath the lower joints. Leaves rather large, spreading, hispid on both sides. Flowers in whorls, numerous. Calyx hispid, the teeth pungent. Corolla whitish or purplish, with a longish, white tube; lower lip 3-lobed, usually mottled with purple.


Hab. Corn-fields. Very common about Edinburgh, Maughan. August, September. O.

Large-flowered Hemp-Nettle.—Similar in habit to the last, but larger and more robust. Stem stout, 1-2 feet high, 4-angled, branched, very hispid. Leaves large, spreading, petiolate, pale green. Corolla large, handsome, yellow, the lower lip with a large purple spot.


(Nat. Ord. Labiat.e, Hook. Scot. 2. p. 216.)


DIDYNAMIA. GYMNOSPERMIA. STACHYS.

Wood Betony.—Plant rough with hairs. Stem 12-18 inches high, 4-angled. Radical leaves on long petiol, ovate, serrate; uppermost ones sessile, ob-long, opposite. There is a considerable space between the uppermost pair of leaves and the spike; and the first whorl of the spike is rather distant from the others, and is furnished with a pair of leaf-like bracteas. Flowers rose-colour.

8. STACHYS.
(Nat. Ord. Labiate, Hook. Scot. 2. p. 216.)


Hab. Hedges and waste shaded places, not common about Edinburgh. King’s Park, Mr Bainbridge. N. Queensferry. July, August. 〒.

Hedge Woundwort.—Root creeping. Stem 2-3 feet high, 4-angled, very erect, hairy. Leaves dull green, hairy, spreading, thin and pliable, diminishing in size upwards until they change into linear bracteas. Calyx hairy, with 5 acute teeth. Corolla dingy purple, the lower lip whitish, and mottled with dark spots and lines.—Plant exceedingly factit.


Ambiguous Woundwort.—Hairy. Root creeping. Stem erect, 2-3 feet high, 4-angled, hollow according to Smith, in which it differs from the last. Leaves oblong, cordate at the base, petiolate. Corolla purple, with the lower lip mostly but not always mottled.


Hab. Moist places, stream-sides. King’s Park, Mr Yalden. Ditches by the road-side SW. of Caroline Park. August. 〒.

Marsh Woundwort.—Root creeping. Stem about 2 feet high, hispid. Leaves serrate, pubescent above, woolly beneath, and with reticulated veins; the lower ones petiolate, the upper ones sessile. Corolla purple, the lower lip rounded, variegated with white and purple.—Odour very strong.


Hab.—Corn-fields and waste places. Regent Road, Mr D. Steuart. August. 〇.

Corn Woundwort.—Stems weak, sometimes decumbent, or even prostrate, 7-16 inches long, branched, smooth or hairy. Leaves small, petiolate, subpilose on each side. Flowers very short.

9. BALLOTA.
(Nat. Ord. Labiate, Hook. Scot. 2. p. 217.)

Marrubium. Didynamia. Gymnospermia. 133

HAB. Waste places. King's Park, Mr Yalden. Same place, with white flowers, Mr D. Steuart. July, August. ɣ.

Black Horehound.—Stems numerous, about 2 feet high, branched, hairy. Leaves petiolate, sometimes subcordate. Flowers in axillary whorls, pedicelled and bracteated, purple, rarely white. Upper lip of the corolla hairy, the lower one streaked with white, 3-lobed, central lobe obcordate. —Plant very fetid.

10. MARRUBIUM.


HAB. Road-sides and waste places. Burntisland, Lightfoot; Guillon Links; Long Niddry, Maughan. Inchcolm, Mr Neill. Road-side near Warrender House. August. ɣ.

White Horehound.—Stems numerous, 12–20 inches high, 4-angled, whitish, and woolly. Leaves petiolate, very woolly beneath. Whorls villose, many-flowered. Flowers small, white; upper lip of the corolla bifid; lower lip 3-lobed, the lateral ones small, acute.

11. LEONURUS.


HAB. Among rubbish, and waste places. Behind Fisherrow, and in Colinton woods, Maughan. August. ɣ.

Motherwort.—Stem 2–3 feet high, erect, branched, 4-angled, villose. Leaves very numerous, petiolate, spreading, dull green, paler beneath, and pubescent, the lowest the broadest. Flowers reddish-white, in numerous whorls. Calyx stiff, the teeth sharp and spreading. Corolla downy on the upper lip.

12. CLINOPODIUM.


HAB. Dry waste bushy and stony places, common. Very abundant in the King's Park, Mr Yalden. Salisbury Craigs, Mr Arnott. August. ɣ.

Wild Basil.—Stem slightly crooked, 12–18 inches high, hairy, 4-angled. Leaves rather small, petiolate, hairy. Whorls axillary and terminal, on branched pedicels, accompanied with hairy setaceous bracteas. Calyx 2-lipped, the lower one of 2 teeth. Corolla purplish-red, middle lobe of the lower lip very broad, notched.

13. ORIGANUM.

14. **DIDYNAMIA. GYMNOSPERMIA. SCUTELLARIA.**

**Hab.** Dry bushy or waste places. Near Burntisland by the shore; banks of the Water of Leith, Mr Neill. July, August. *f.*

Common Marjoram.—Root creeping. Stems many, hairy, purplish, 8-12 inches high. Leaves slightly hairy, dotted. Flowers rose-coloured, in numerous small spikes, which are crowded together so as to form a roundish, clustered, terminal head. **Corolla** rather small. **Calyx** subequal.—Aromatic.

14. **THYMUS.**


**E. B. t. 1514.**

**Hab.** Dry pastures, common. King's Park, where it also occurs with white flowers, Mr D. Steuart. July, August. *f.*

Wild Thyme.—Stems spreading, procumbent, branched, slender, slightly shrubby, pubescent, and mostly reddish. **Leaves** plane, small, more or less hairy, sometimes hoary. **Flowers** purple or white, on very short hairy pedicels. **Calyx** ribbed, dotted, the 2 lower teeth most acute. **Lower lip** of the corolla 3-lobed.—Plant very aromatic.

15. **SCUTELLARIA.**


**E. B. t. 523.**

**Hab.** Marshes and sides of lakes. Marsh near Dundas Hill, Mr Neill. July, August. *f.*

Common Skull-cap.—Root creeping. Stem erect, 12-18 inches high, somewhat branched, very leafy, 6-angled. **Leaves** very shortly petiolate, spreading, paler beneath. **Flowers** pubescent, blue, subsessile, solitary, or in pairs. **Calyx** hairy, closed in a remarkable manner after flowering.

16. **PRUNELLA.**


**E. B. t. 961.**


Self-heal.—Stem mostly decumbent at the base, 6-12 inches high, 4-angled, hairy. **Leaves** opposite, ovate, or ovate-oblong, hairy, entire, or somewhat toothed at the base, dull green. **Flowers** purple, in obtuse, oblong-cylindrical, solitary spikes, each whorl accompanied by a pair of broad imbricating bracteas. **Calyx** closed when in fruit. **Corolla** with the lower lip 3-lobed, and finely toothed. **Stamens** forked.

**II. ANGIOSPERMIA.**

17. **BARTSIA.**

*(Nat. Ord. Scrophularinæ, Hook. Scot. 2. p. 219;)*


**Euphrasia. Didynamia. Angiospernia.** 135


HAB. Corn-fields and waste places, abundant. August, September. ☉.


18. **Euphrasia.**

*(Nat. Ord. Scrophularinæ, Hook. Scot. 2. p. 213.)*


HAB. Dry pastures, very common. July. ☉.

Eye-bright.—Stem slightly branched, 2–6 inches high, rough with deflexed hairs. *Leaves* opposite, small, hairy, the veins furrowed. *Flowers* axillary, towards the summit of the branches, whitish or pinkish, streaked with purple lines, the lower lip yellow at the orifice of the tube. *Calyx* 4-toothed, hairy. *Corolla* with the upper lip rather irregularly divided. *Anthers* armed with 2 spines at the base.

19. **Rhinanthus.**

*(Nat. Ord. Scrophularinæ, Hook. Scot. 2. p. 219.)*


HAB. Meadows and pastures, very abundant. June. ☉.

Yellow Rattle.—Stem about a foot high, slightly branched, smooth, 4-angled, often spotted. *Leaves* sessile, veined. *Flowers* yellow, axillary, crowded towards the summit. *Calyx* inflated after flowering, and enlarged, 4-toothed, dry and scariose when the seeds are ripe. *Corolla* with the lower lip 3-lobed. *Anthers* awnless, hairy. *Seeds* with a membranaceous border.

20. **Melampyrum.**

*(Nat. Ord. Melampyraceæ, Hook. Scot. 2. p. 213.)*


Common yellow Cow-wheat.—Stem branched, 12–18 inches high, slender, glabrous; branches opposite, spreading. *Leaves* lanceolate, acuminate, patent, opposite, glabrous. *Flowers* in pairs, yellow, secund, in a leafy spike or raceme. *Bracteas* pinnato-dentate. *Corolla* of a paler yellow towards the base, the upper lip fringed.—*M. sylvaticum,* with which it has often been confounded, has an open *corolla,* only half as long again as the *calyx,* and the lower lip not protruded.

21. **Lathraëa.**

*(Nat. Ord. Orobancheæ, Hook. Scot. 2. p. 222.)*

1. **L. squamaria,** stem simple; flowers pendulous, the lower
DIDYNAMIA. ANGIOSPERMIA. PEDICULARIS.


Greater Toothwort.—Root, at least the part below ground, with a few short branches thickly clothed with large, white, fleshy, brittle, imbricating scales. Stem 3-8 inches high, scaly, whitish, thick and brittle. Flowers whitish or purplish, racemled, pointing in one direction, pedunculate, accompanied with scale-like bracteas. Calyx large, 4-toothed. Corolla with the upper lip 2-lobed; lower one 3-lobed. Anthers hairy.

22. PEDICULARIS.

(Nat. Ord. Scrophularinæ, Hook. Scot. 2. p. 219.)


Hab. Bogs and marshy places, frequent. At Duddingston Loch, Mr Bainbridge. Pentland Hills. July. _modify_.

Marsh Louse-wort.—Stem 8-16 inches high, erect, rather stout, more or less branched, angular, hairy. Leaves scattered, sub-bipinnatifid, the leaflets ovate. Flowers solitary, axillary, rose-coloured, shortly pedunculate, in leafy spikes. Calyx ventricose. Corolla with the upper lip arched, compressed, the lower one 3-lobed; tube white. Capsule ovate.


Common dwarf Louse-wort.—Stems 3-6 inches high, often decumbent, simple, angular. Radical leaves simple, ovate, crenate; cauline ones pinnate. Flowers axillary, rose-coloured, larger than the preceding. Calyx oblong, tubular, irregularly 5-cleft, and crenate.

23. ANTIRRHINUM.

(Nat. Ord. Scrophularinæ, Hook. Scot. 2. p. 219.)

* Stems procumbent.


Hab. Rocky places and old walls. New road to Portobello. Trinity Mains, Mr D. Steuart. Debris of Salisbury Craigs. June—September. _modify_.

Ivy-leaved Toad-flax.—Stems long, filiform, very weak. Leaves numerous, petiolate, rather fleshy, often purplish beneath. Flowers solitary, on axillary, long peduncles, purplish; the palate yellow.—First introduced into England at the Apothecaries Garden, Chelsea, Neill.

** Stems erect.

2. A. repens, leaves linear, whorled or scattered; stem pani-
Scrophularia. DIDYYNAMIA. ANGIOSPERMIA. 137


Hab. In waste places, rare. Banks of the Esk, above Musselburgh, Miss Ker. July—September. ½.

Creeping-rooted Tod-flax.—Root creeping and spreading rapidly, white. Stems many, erect, 12-18 inches high, glabrous, divided into flowering branches at the summit, in a panicled manner. Leaves somewhat whorled, chiefly so at the base, where they soon "die away," scattered above; nearly linear, glaucous. Flowers numerous, shortly pedunculate, pale, purplish, the upper lip striated, the palate yellow.


Yellow Tod-flax.—Root creeping, quickly spreading. Stems 1-2 feet high, glaucous, glabrous, mostly simple, thickly clothed with sublinear glaucous spreading leaves. Flowers spiked, large bright yellow, with an orange, downy palate; the spur long, acute, much longer than the calyx. This species, as well as the last, is subject to a curious monstrosity, known by the name of Peloria; each flower has then 5 spurs.

24. SCROPHULARIA.

(Nat. Ord. SCROPHULARINÆ, Hook. Scot. 2. p. 220.)


Hab. Moist woods, hedges, and waste places, frequent. King's Park, Mr Yalden. Inchcolm, abundant, Mr Neill. July. ½.


Hab. Banks of ditches and watery places. Rivulet near the entrance to Hopetoun House, Mr Neill. July. ½.

Water Figwort.—Root fibrous. Stems 3-5 feet high, 4-angled, angles winged. Leaves petiolate, glabrous, veiny, decurrent. Flowers in a terminal, branched, elongated panicle, with bracteas; greenish purple. Calyx, with 5 very obtuse teeth. Corolla shorter than in the preceding. Capsule roundish.

DIDYNAMIA. ANGIOSPERMIA. DIGITALIS.


25. DIGITALIS.


Hab. Road-sides and sandy waste places, common. Craigleith Quarries, with white flowers, Mr Neill. July. 

Purple Foxglove.—Stem erect, 2-4 feet high, stout, mostly simple. Leaves large, the radical ones spreading, crenate; the cauline ones, alternate, somewhat decurrent, diminishing in size upwards. Flowers large, numerous, in a long pyramidal spike, purple, rarely white, drooping. Corolla tubular, above an inch long, hairy, and spotted within.—A magnificent plant, excelled by few exotics. Employed medicinally.

26. VERBENA.


Hab. Waste places. Near the gates of Inverkeithing, Dr Parsons in Lightfoot. August. 

Common Verain.—Stem erect, rough, slender. Leaves petiolate below, much cut, roughish. Spikes terminal, many-flowered, filiform. Flowers small, purple, nearly equally 5-cleft, accompanied by small bracteas. "Periary soon disappearing, leaving the 4 really naked seeds at the bottom of the calyx;" Hook.

27. OROBANCHE.

(Nat. Ord. Orobancheae, Hook. Scot. 2. p. 222.)


Greater Broom-Rape.—Stem 12-18 inches high, furrowed, very scaly at the base, less so upwards, pubescent, leafless. Flowers sessile, numerous, in a long rich spike, purplish, "clothed with rusty downiness." Calyx of 2 bifid segments. Corolla as long again as the calyx, the lower lip 3-lobed; lobes acute, the middle one somewhat the largest. Stamens shorter than the corolla.


Hab. Banks and rocky places in basaltic districts, very rare. Near Sea-
field Tower between Kirkcaldy and Kinghorn, Messrs Sommerville and E. Maughan, (supposed at the time to be O. major.)

Red Broom-Rape.—Stem 6-12 inches high, rounded, roughish with viscid glands, very scaly at the thickened base, less so upwards, of a rich reddish colour, leafless. Flowers in a rather dense oblong spike, purplish red. Calyx of 2 entire lanceolate leaflets. Corolla ventricose, slightly curved. Stamens glandulose at the base and summit, shorter than the corolla.

XV. TETRADYNAMIA.

I. SILICULOSA.

1. CAKILE.


Sea-Rocket.—Plant glabrous and fleshy. Stem flexuose, with thickish, crooked, spreading branches 6-12 inches high. Leaves alternate, rather numerous. Flowers pale purple, in dense terminal corymbs, which are gradually elongated into fruit-bearing racemes. Silicula thick, fleshy, becoming somewhat woody.

2. CORONOPUS *.


Swine's Cress.—Stems prostrate, branched, spreading, glabrous. Leaves alternate, irregularly bi-pinnate; segments linear, glabrous. Flowers minute, white, forming axillary, spiked corymbs. Silicula subreniform, compressed, muricate or crested with a number of sharp points, which terminate as many rugosities: cells 1-seeded.

3. THLASPI.


Hab. Corn-fields and waste places, rather rare. Corn-fields about Edin-

* This forms a part of the genus Seneciera of De Candolle, but is retained by our learned countryman Mr R. Brown.
burgh, Maughan. Burntisland, Mr Arnott. Queensferry, Mr D. Steuart. June, July. ©.

Penny-cress.—Stem erect, about a foot high, glabrous, somewhat branched, rather naked below. Leaves glabrous. Flowers white, small, in a spike which elongates during the flowering. Silicula very large, with dilated wings, shorter than the pedicel.


Hab. Waste places and road-sides, every where. Spring to autumn. ©.

Common Shepherd’s Purse.—Stem 3–12 inches high, erect, rough with hairs, slightly branched. Leaves; radical ones spreading, pinnatifid, hairy; cauline ones alternate, erect, oblong, toothed, sagittate at the base. Flowers small, white, in terminal, spiked racemes, elongated in seed. Silicula obcordate, not winged, much shorter than the pedicel.—Varies greatly in appearance, but the flowers and siliculae are constant.

4. LEPIDIUM.


Broad-leaved Pepperwort.—Glabrous. Stem 2–3 feet high, erect, branched. Leaves sessile upwards, entire or sub dentate, attenuate at each extremity. Flowers small, white, very numerous, disposed in a racemose, clustered manner at the ends of the branches, intermixed with very small leaves. Calyx whitish. Petals ovate, longer than the calyx.


Hairy Field Pepperwort.—Stem 6–10 inches high, very leafy. Leaves almost glabrous at the base, petiolate, dentate; cauline ones sessile, hoary with pubescence, oblong, sagittate, the margin dentate or subentire. Flowers white, small, in obtuse, hairy, racemes. Silicula emarginate, with a longish style.—In my specimens the siliculae are glabrous.

5. COCHLEARIA.


Hab. The sea-coast, and on mountains. Coast of the Frith, plentiful. May. ©. ©, DC.

Common Scurvy-grass.—Glabrous, bright green, succulent. Stems many,
angular, suberect, branched, 3-12 inches high. *Leaves* varying exceedingly in size according to situation, large on the sea-coast; lower ones broadly cordate, or even subreniform, entire or subdentate; cauline ones embracing the stem with their toothed base. *Flowers* white, in corymbose heads, which elongate into fruit-bearing racemes.—Plant celebrated for its efficacy in removing scurvy.


Danish Scurvy-grass.—Glabrous. *Stems* 3-6 inches long, suberect or decumbent, rather slender. *Leaves* small, 3-5 lobed, rarely entire, all petiolate or nearly so. *Flowers* smaller than the preceding, white, in corymbose racemes. *Siliculae* reticulated with veins, tipped with a very short style.


*Hab.* Waste places, rare. Field near Craigcrook, Maughan. Duddingston Loch, Mr Arnott. May. 7.

Horse-Radish.—Root large, white, thick, long, very pungent to the taste. *Stems* about 2 feet high, erect, branched upwards, angular. Radical leaves very large, oblong, veiny, glabrous; cauline ones less, either subentire or lobed, or cut at the margin. *Flowers* white, in elongating racemes. *Siliculae* compressed, often not perfecting seeds, tipped with a very short style, the stigma dilated.—Root in constant use for the table.

6. SUBULARIA.


1. S. aquatica.

*Hab.* The gravelly margins of alpine lakes. Otterston Loch, Fifeshire, Maughan. (I fear this station may be erroneous.) July. ©.

Awl-wort.—Leaves all radical, subulate, glabrous, not an inch long. *Scape* erect, 1-2 inches high, often wholly under water, simple or slightly branched. *Flowers* very minute, white, few, forming a raceme when in fruit. *Siliculae* ovato-elliptical, tipped with the sessile roundish stigma.

7. DRABA.


*Hab.* Wall tops, rocks, &c. very abundant. March—May. ©.

Common Whitlow-grass.—Leaves all radical, lanceolate, spreading in a radiating manner, entire or unequally toothed. *Scape* 2-6 inches high,

* This, with four other species, forms the genus *Erophila* of De Candolle.

It differs from *Draba* solely in the petals being bifid.
simple, slender, terminating in a small corymbose head of minute white flowers, which elongates into a fruit-bearing raceme. Petals bifid. Siliculae rather distant, elliptical, compressed, glabrous.


Hab. Walls. Field behind the old Botanic Garden; Bellevue, G. Don. (Certainly not indigenous, about Edinburgh at least.) May. O.

Speedwell-leaved Whitlow-grass.—Stems simple or branched, 3-10 inches high, scabrous. Cauline leaves alternate, subcordate, sessile, dentate, scabrous. Flowers small, numerous, white, in elongating racemes. Petals entire. Pedicels of the fruit spreading. Siliculae half the length of the pedicels, obovate-oblong, glabrous.

8. CAMELINA.


Hab. Fields and waste places, rare. Near Inverkeithing, Mr J. Stewart, Calton Hill, Mr D. Stewart. June, July. O.

Gold of Pleasure.—Stem about 2 feet high, rounded, branched upwards in a paniced manner. Leaves roughish, embracing the stem with their sagittate base. Flowers numerous, in corymbs at first, afterward racemed, small, yellow. Silicula on long pedicels, curved upwards, mucronate with the pointed style.

II. SILICIQUOSA.

9. CARDAMINE.


Bitter Lady's Smock.—Stem a foot high or more, often decumbent at the base, glabrous. Leaves glabrous, the upper ones sometimes slightly pilose, petiolate. Flowers in a terminal corymb, large, white. Petals with a yellowish claw, the limb rounded. Anthers purplish. Silicula linear, about an inch long.


Hab. Moist meadows, very common. May. 7f.

Common Lady's Smock.—Stem a foot high or more, mostly erect. Leaves
Arabis. TETRADYNAMIA. SILIQUOSA. 143

glabrous, or rarely somewhat pilose; lower leaflets angular or subsinuate; upper ones varying from lanceolate to linear. Flowers purplish, rather large, in a terminal, elongating corymb. Anthers yellow. Siliquae linear, near an inch long. Stigma capitate.—Flower sometimes double in the wild state.


Hab. Moist waste places. Banks of rocky, shady rivulets, common. King's Park, Mr Bainbridge. May, June. ☀.

Hairy Lady's Smock.—Plant varying much in size according to situation. Stem erect, 3-18 inches high, branched, somewhat angular. Leaves more or less hairy, the leaflets varying in form, mostly roundish or ovate, petiolate. Flowers very small, white, numerous, in small corymbs, which elongate into racemes as the fruit advances. Stamens 4-6. Siliqua filiform, glabrous or somewhat pilose.

10. ARABIS.


Hab. Walls, roofs, dry gravelly banks; common. King's Park, Mr Yalden. Very abundant about St Anthony's Chapel, Dr Graham. April, May. ☀.

Common Wall-Cress.—Stem slender, erect, branched, rounded, hairy, 2-10 inches high. Leaves; radical ones spreading, shortly petiolate, hairy and ciliate; cauline ones few, sessile, diminishing in size upwards. Flowers small, white, in a corymb, which gradually changes to an elongated raceme. Siliquae slender, ascending, a little longer than the filiform pedicels.


Hairy Tower Mustard.—Stem erect, stiff, 8-12 inches high, rough with hairs, round, very leafy. Leaves very scabrous, more or less dentate, numerous; cauline ones suberect. Flowers white, small, corymbose; corymb becoming a long raceme. Siliquae numerous, an inch long, linear, straight, erect, compressed. Stigma subsessile.

11. BARBAREA.

1. B. vulgaris, lower leaves lyrate, the terminal lobe round-
TETRADYNAemia. SILiquOsa. Nasturtium.


Hab. Banks of streams and moist places, rare. Banks of the Water of Leith, Dr Parsons. Road-side south of Dalkeith; and banks of the Esk, Dr Graham. May, August. 

Bitter Winter-Cress.—Stems 1–2 feet high, erect, mostly branched, furrowed, glabrous. Leaves glabrous, shining, dark green; lower ones petiolate, upper ones sessile. Flowers rather small, yellow, very numerous, in a rounded corymb head, which elongates to a raceme. Silique half an inch long, erecto-patent.—Plant bitter, nauseous and mucilaginous, according to Smith.


Early Winter-Cress.—Stem 1–2 feet high, rather slender, erect, furrowed, glabrous. Leaves glabrous, smaller than the preceding, and the cauline ones pinnatifid. Flowers small, yellow, less numerous. Silique near thrice as long as the preceding.

12. NASTURTIUM. 


Hab. Brooks and ditches, very common. King's Park, Mr Yalden. July. 

Water-Cress.—Stems decumbent, and floating if in deeper water, radiating at the base, angular, somewhat branched. Leaves glabrous, shining, the lower ones the largest; leaflets 5–7, the terminal one large, roundish. Flowers white, small, in a flattish corymb, which at length is racemaged. Silique scarcely an inch long, forming an ascending angle with the patent pedicels.—Esteemed as a salad.


Marsh Nasturtium.—Stem a foot high or more, mostly erect, glabrous, furrowed, branched. Leaves glabrous, all more or less pinnatifid, the terminal lobe ovate or oblong. Flowers numerous, minute, yellow. Raceme rather long. Silique short, turgid; pedicels as long as the silique, patent.

3. N. amphibium, leaves oblong-lanceolate, pinnatifid or serrate; root fibrous, petals longer than the calyx; siliculae ellip-
Sisymbrium. TETRADYNAMIA. SILIQUOSA. 145
Hab. Margins of lakes and wet places. Duddingston Loch, Mr Yalden. July, August. 2.
Amphibious Nasturtium.—Stems 2–3 feet high, somewhat branched, radicating at the base, erect, or rather straggling, furrowed. Leaves semi-amplexicaul: those above water serrate, or subentire, sometimes pubescent; those beneath more or less pinnatifid or divided. Flowers yellow. Siliqua in elongated racemes, short, oblong-elliptical, tipped with the filiform style; pedicels patent, at length subreflexed, twice as long as the siliqua. —A very variable plant in the character of the leaves *.

13. SISYMBRIUM.
(Nat. Ord. Cruciferæ, Hook. Scot. 2. p. 269.)
Hab. Road-sides and waste places, very common. June, July. ♀.
Common Hedge-Mustard.—Stem 1–2 feet high, branched, rather rigid; branches spreading, hispid. Leaves hairy or subglabrous, petiolate, lobes toothed, not regularly runcinate, terminal one large, roundish or subtriangular on the lower leaves, ovate or oblong on the upper ones. Flowers minute, yellow, numerous. Racemes very long. Pedicels and Siliqua erect, appressed, the former very short; the latter about half an inch long.
Flixt-weed.—Stem about a foot high, branched. Leaves petiolate, segments linear, acute, glabrous or pubescent, the terminal one the longest. Flowers small, yellow, numerous. Fruit-bearing raceme very long. Siliqua linear, near an inch long, erect; pedicels erecto-patent, filiform, one-third of the length of the siliqua.

14. CHEIRANTHUS.
(Nat. Ord. Cruciferæ, Hook. Scot. 2. p. 290.)
Hab. Old walls and ruins. King’s Park, Mr Yalden. On Salisbury

* Decandolle has, besides the common appearance, two varieties, which may be met with probably in this country.

a. indivisum, all the leaves nearly entire or serrate.
b. variifolium, some of the leaves serrate, some pectinato-pinnatifid, others capillaceo-multifid. This I have received from Canada, from Dr Holmes.
TETRADYNAMIA. SILIQUOSA. Brassica.

branches raceme the Wall-flower stem lower radical leaves petals

B. siliqua the Hook. caul p. lyrate, p. margin line 146

Dame's Turnip. — Root woody. Stem brownish, a foot high, branched, erect, furrowed; branches green. Leaves numerous, rigid, often reddish and spotted towards the apex. Flowers yellow, in a corymb, which becomes at length a fruit-bearing raceme. Calyx of 4 erect reddish leaves. Petals with a long claw, and a broad spreading or recurved limb. Siliqua suberect, straight, about an inch long. — Very fragrant. Several varieties cultivated in gardens.

15. HESPERIS.


Dame's Violet. — Stem 1–2 feet high, simple or somewhat branched, hairy. Leaves varying from ovate-lanceolate to subcordate, toothed or serrate, acuminate, hairy. Flowers purple or rose-coloured, large, fragrant at night, but scentless during the day. Calyx erect. Petals obovate, with a long claw, the limb spreading, entire, or emarginate.

16. BRASSICA.


Hab. Corn-fields and waste places. Rocks behind Edinburgh Castle, Dr Parsons. June. 占有率

Wild Nave or Cole-seed. — Root fusiform. Stem erect. 1–2 feet high, round, glabrous, glaucous, branched. Leaves lyrate below; lower cauline ones somewhat pinnatifid; the upper ones often entire, all glaucous, smooth. Flowers yellow, numerous, rather small. Siliqua erecto-patent, straight, torulose, longer than the pedicels; raceme long. — Oil is expressed from the seeds.


Hab. Borders of fields. Behind Edinburgh Castle, Dr Graham. April, May. 占有率

Turnip. — Root fleshy, succulent, whitish. Stem erect. 1–3 feet high, round, glabrous, branched. Leaves; radical ones petiolate, spreading, deep green, not glaucous; the terminal lobe large, roundish, widely toothed; cauline ones sessile. Flowers yellow, in a lax corymb, which quickly elongates into a raceme. Calyx spreading. Siliqua suberect, an inch long; pedicels nearly the same length. — The root is a well known treasure to the agriculturist.

3. B. oleracea, leaves covered with a glaucous bloom, fleshy.

**Hab.** Marine banks and rocks, Inchkeith, G. Don. Incheimon, Maughan. May, June. ☼.

**Sea Cabbage.**—Root caulescent for some height above ground. Stem 6-18 inches high or more, erect, round, glabrous. *Leaves* thick, fleshy, glabrous, variously lobed, waved, and sinuate; *uppermost* ones oblong. *Flowers* large, pale yellow, in a corymb, which becomes a raceme. *Calyx* erect. *Petal* obovate, lax. *Siliqua* erect, torulose an inch long.


**Hab.** Corn-fields, rare. Road-side leading from Leith to Queensferry, near Bangholm, G. Don. August. ☼.

**Field Cabbage.**—Root fusiform, slender. Stem erect, 1-2 feet high, branched, hispid below. *Radical leaves* hispid beneath on the veins, as well as often on the upper surface: *cauline* ones glabrous. *Flowers* yellow, corymbose. *Calyx* somewhat spreading. *Siliqua* in a raceme, about an inch long, somewhat torulose, obsolescely 4-sided, tipped with the subulate style.

17. SINAPIS.


**Hab.** Corn-fields, very abundant. May, June. ☼.


**Hab.** Corn-fields and waste places, frequent. Corn-fields about Edinburgh, Maughan. July. ☼.

**White Mustard.**—Stem 12-18 inches high, branched, erect, slightly hairy. *Leaves* mostly glabrous, between lyrate and pinnatifid, the terminal lobe large, all unequally, obtusely or acutely dentate. *Flowers* yellow, rather large, corymbose. *Petal* obovate, entire. *Siliqua* in a long raceme, glabrous or subhispid, spreading, ovate-oblong, with a long, broad ensiform beak. *Seeds* large, pale.

18. DYPLITAXIS *.

*(Nat. Ord. Cruciferae, Hook. Scot. 2. p. 290. (Sinapis tenuifolia.)*

1. D. *tenuifolia,* *siliqua* pedicillate, erect, style short, fili-

Hab. Waste places. Coast of Fife at St David's, Mr Neill. July, August. 

Fine-leaved Mustard.—Glabrous. Stem erect, 1-2 feet high or more, round, branched. Leaves rather fleshy, somewhat glaucous, varying much in their form and division, the lobes of the pinnate or bipinnate ones rather distant, somewhat acute; upper ones mostly undivided, more or less linear, often toothed. Flowers yellow, rather large. Petals twice as long as the spreading calyx. Siliqua erect, linear, compressed, above an inch long, sometimes hairy at the apex. Seeds in 2 series.—Plant acrid and pungent to the taste, and with a foetid smell, when bruised.

19. RAPHANUS.


Hab. Corn-fields, very common. June, July. 

Wild Raddish or Jointed Charlock.—Stem 1-2 feet high, branched, hispid. Leaves lyrate, toothed, scabrous. Flowers large, pale lemon-yellow, veined with purple. Calyx erect, slender, setose. Petals obovate, lax. Siliqua, including the beak, an inch and a half long, apparently jointed, and the cavities subglobose, but within they are 1-celled.

XVI. MONADELPHIA.
I. PENTANDRIA.

1. ERODIUM.
(Nat. Ord. Geraniaceae, Hook. Scot. 2. p. 274.)


Hab. Dry sandy pastures and waste places, frequent. King's Park, Mr Bainbridge. Leith Links, with purple flowers only, Dr Graham. (On the south side of Arthur's Seat, by the foot-road to Duddingston, chiefly with whitish flowers, Dr Graham.) June—September. 

Hemlock-leaved Stork's-bill.—Hairy. Stems several, prostrate, reddish, spreading, 3-8 inches long. Leaves alternate, as are also the leaflets. Stipules ovate, acute, membranaceous. Flowers purplish or white, in a small umbel, supported by a peduncle 2-3 inches high. Petals obovate.

2. E. moschatum, peduncles many-flowered; leaves pinnate,
Geranium. MONADELPHIA. DECANDRIA. 149


*Hab.* Dry sandy, hilly pastures, rare. Near Prestonpans, Dr Graham. June, July. o.

_Musk Stork's-bill._—Pilos- glandulose. *Stems* prostrate, often almost none, hairy. _Leaves_ pinnate, spreading, petiolate; leaflets 4-6 pair; ovate, serrate, or toothed. _Flowers_ rose-colour, 5-6 in a small pedunculate umbel; the peduncle suberect, 2-3 inches high. _Involucre_ roundish, crenate. _Calyx_ "tipped with red glands" (Sm.) _Petal_ longer than the calyx, but smaller than in the preceding.

II. DECANDRIA.

2. GERANIUM.


*Peduncles_ 1-flowered.


_Bloody Crane's-bill._—Roots woody. *Stems* rather weak and spreading, branched, about a foot long, swelling above and below each joint. _Leaves_ opposite, petiolate. _Peduncles_ very long. _Flowers_ very large, crimson red. _Calyx_ leaves ovate, mucronate.—Very handsome.

**Peduncles_ 2-flowered. Roots perennial.


*Hab.* Meadows and moist thickets. King's Park, Mr D. Stuart. July. 7.

_Crow-foot-leaved Crane's-bill._—Stems 1-2 feet high, branched, swollen at the joints, pubescent. _Radical leaves_ on long erect petiols, divided almost to the centre into 5 or 7 lobes, each of which is variously cleft, and every segment acute. _Flowers_ very large, pale purple. _Petal_ broadly obovate, veined. _Calyx_ leaves mucronate. _Seeds_ dotted.


_Wood Crane's-bill._—Stems 1-2 feet high or more, erect, hairy, branched, the uppermost branches somewhat corymbose. _Leaves_ opposite, petiolate, softish, vein, hairy, the lobes rather broad, but ending acutely.
Flowers purple, smaller than the two preceding species. Petals obtusely obovate, entire or notched, veined. Seeds dotted.—Well distinguished from the last, by the style much shorter than the stamens, and from the next by the much longer awn of the calycine leaves.


Dusky Crane's-bill.—Root strong. Stems erect, 1-2 feet high or more, hairy, branched, panicled at the summit. Leaves 5-7-lobed, cut and serrate, hairy, lobes rather broad, the uppermost sessile. Flowers dark chocolate; the base of the claw whitish. Calyx very hairy, with a very short mucronate point.


Hab. Pastures and waste places, rare. Near Edinburgh, Dr Parsons. In a lane leading from the south-east part of Edinburgh to the King's Park, abundantly, Sir J. E. Smith. July. ±

Mountain Crane's-bill.—Stem 9 inches to above 2 feet high, suberect, branched, hairy, panicled above. Leaves petiolate, opposite, hairy, varying in the breadth of the lobes, upper ones more acute. Flowers rather large, purple. Calyx short, hairy, submucronate. Capsules keeled, but not wrinkled, when young pubescent.

*** Peduncles 2-flowered. Root annual.


Round-leaved Crane's-bill.—Stems straggling, ascending or suberect, pubescent, branched. Leaves opposite, scarcely cleft half-way to the centre, the lobes cut at the extremity, pale green, softly pubescent. Flowers small, rose-coloured, on short peduncles, pedicels divaricate. Petals entire. Seeds finely dotted.


Hab. Pastures and waste places, very common. July. ♂

Dove's-foot Crane's-bill.—Stems several, 3-12 inches long, spreading, decumbent, slightly branched, pubescent, mostly tinged with red. Leaves alternate, petiolate, softly pubescent on each side, cleft more than half-
Geranium. MONADELPHIA. DECANDRIA. 151

way into obtuse broad lobes. Peduncles opposite the leaves, hairy, shortish, divaricating. Flowers small, pale reddish or purple.


Hab. Waste stony places, frequent. King's Park, &c. June—September. ©. Stinking Crane's-bill, or Herb-Robert.—Stem much branched, spreading, decumbent or ascending, above a foot long, reddish, hairy. Leaves much divided, lax, petiolate, opposite. Flowers rather large, purple, on long peduncles. Petals white at the base, entire. Capsules keeled, rugose. Seeds smooth.—Plant with a strong foetid smell, which has been compared to that of a fox.


Hab. Corn-fields and waste places, frequent. The Meadows, Dr Parsons. King's Park, Mr Bainbridge. Fields about Lochend. May—July. ©. Jagged-leaved Crane's-bill.—Stems branched, slender, spreading or suberect, clothed with deflexed hairs. Leaves opposite, petiolate, slightly hairy, cleft to the base into linear, trifid or laciniate lobes, the uppermost ones
with undivided segments. *Flowers* on short peduncles, pale red. *Capsules* hairy.


### III. POLYANDRIA.

#### 3. MALVA

*(Nat. Ord. MALVACEAE, Hook. Scot. 2. p. 274.)*


Dwarf Mallow.—Root fusiform. *Stems* several, prostrate, 6–12 inches long, sub-simple, hairy. *Leaves* hairy, smaller, 5–7-lobed, lobes obtuse, crenate, on hairy petiols. *Flowers* small, purplish, axillary, on pedicels, 2–3 growing together. *Petals* obcordate, at most as long again as the calyx.  

—Petals sometimes very small, as in *M. pusilla* of E. B.


Musk Mallow.—Plant rough with hairs. *Stems* 2–3 feet high, slightly branched. *Radical leaves* on long petiols, cleft into 3–5 main lobes, each of which is again 3-lobed and cut; segments of the cauline ones linear, acute. *Flowers* large, rose-coloured, very beautiful, produced towards the summit. *Petals* obcordato-cuneiform. *Outer leaves* of the calyx linear.
Fumaria. Diaelphila. Hexandria. 153

4. Lavatera.


Sea-side Tree-Mallow.—Stem 3-10 feet high, erect, stout, mostly quite simple. Leaves on long petiols, roundish, cordate, somewhat lobed, tomentose. Flowers numerous, purplish, much darker in the centre. Outer calyx deeply 3-cleft.—It rarely attains a considerable size in the above stations.

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XVII. Diaelphila.
I. Hexandria.

1. Fumaria.


Hab. Corn-fields and neglected gardens, frequent. May—August.

Common Fumitory.—Glabrous, glaucous. Stem erect, branched, spreading, a foot high, angular. Leaves much divided, the cauline ones mostly 3-partite, and cleft into linear segments. Flowers rose-coloured, about 12, in a lax, erect raceme. Petals 4, lower one with a green keel. Capsule glabrous, somewhat retuse.


Ramping Fumitory.—Glabrous, glaucous. Stems procumbent or climbing, 1-3 feet long, much branched, angular. Leaves on long petiols, trinate, primary and secondary petiols slender, and serving as tendrils, leaflets 3-cleft, segments ovate or oblong. Pedicelles opposite the leaves, erect. Flowers 5-10, flesh-colour; the pedicels of the glabrous capsules, scarcely longer than the bracteas.

2. Corydalas.
(Nat. Ord. Fumariæ, Hook. Scot. 2. p. 291. under Fumaria.)

1. C. claviculara, stem branched, widely climbing; leaves somewhat bipinnate, divided, segments oval, entire, the petiols cirrhose; bracteas longer than the pedicels. DC. Fumaria
II. OCTANDRIA.

3. POLYGALA.


Hab. Dry hilly pastures, very abundant. June, July. Ɋ.

Milkwort.—Glabrous. Root woody. Stems several, spreading, simple. Leaves numerous, dark green. Flowers fine blue, sometimes white or flesh-colour. Calyx persistent, changing from a blue to a green colour, protecting the young fruit. Corolla crested at the apex.

III. DECANDRIA.

4. GENISTA.

(Nat. Ord. Leguminosœ, Hook. Scot. 2. p. 266.)

* Branches unarmed.


Hab. Banks and wild bushy places, common. June. Ɋ.

Common Broom.—A shrubby plant, 4-10 feet high, with a very great number of erect, angular, slender, evergreen branches, of considerable toughness. Leaves small, and glabrous. Flowers large, handsome, axillary, on solitary, somewhat drooping pedicels, bright golden-yellow. Calyx short, campanulate, 5-toothed. Style twisted. Legume large, very compressed, dark brown.


Dyer's Greenweed.—Root woody. Stems erect, 1-2 feet high, slender, glabrous, between round and angular, branched. Leaves simple, sessile,
mostly glabrous. Flowers yellow, axillary, solitary, subsessile. Calyx with 3 sharp teeth.

**Branches spinose.**


_Needle Furze._—Stems suberect, about a foot high, furnished with simple, patent, very acute spines. Leaves very small. Flowers small, yellow, on small, unarmed, spreading branches, somewhat racemose. _Legume_ oval, very turgid.

5. _ULEX._

(Nat. Ord. _Leguminosae_, Hook. Scot. 2. p. 266.)


_Common Furze, or Whin._—Stems 1–5 feet high, producing innumerable green, spinous branches, in a dense bushy manner. Leaves solitary, small, at the base of the numerous acute spines. Flowers golden-yellow, large, very plentiful, on axillary, mostly solitary 1-flowered pedicels. _Calyx_ pubescent. _Legume_ oblong, pubescent, blackish, about 4-seeded.


_Dwarf Furze._—Much less than the last, with decumbent branches, shorter spines, and smaller flowers. Bracteas very minute, often scarcely visible, appressed to the calyx. _Calyx_ sericeous, the teeth very distinct. _Corolla_ a little longer than the calyx, and not so bright a yellow as the preceding; _Smith._—A doubtful species.

6. _ONONIS._

(Nat. Ord. _Leguminosae_, Hook. Scot. 2. p. 267.)


Hab. Heathy pastures. Road-sides. King’s Park, Mr Yalden. June, August. 12.

_Rest-harrow._—Root woody. Stems erect or procumbent, a foot high, more or less spinose, branched, round, hairy. Leaves small, oval or cuneiform, petiolate. Flowers large, rose-coloured, on axillary, solitary peduncles. _Legume_ scarcely exceeding the calyx, pilose.—Stem and leaves more or less viscid, and with a strong peculiar smell.

7. _ANTHYLLIS._

(Nat. Ord. _Leguminosae_, Hook. Scot. 2. p. 267.)

1. _A. vulneraria_, herbaceous; leaves pinnate, unequal; heads


Kidney Vetch.—Stems several, spreading, decumbent, 3-8 inches long, round, hairy. Leaves alternate, pinnate, glaucous green, hairy beneath; leaflets entire, 5-9. Flowers yellow, in two dense roundish heads, in close contact. Bracteas palmate, immediately beneath the heads of flowers. Calyx hairy.

8. OROBUS.

(Nat. Ord. Leguminosæ, Hook. Scot. 2. p. 267.)


Tuberous Orobus.—Root tuberous, blackish, creeping. Stem a foot high or more, slender, winged. Leaves with 2-3 pair of sessile leaflets, the petiol not cirusose, but ending in a point beyond the last leaflets. Flowers 5-7, in a long pedunculate, clustered, axillary racemae, purplish and reddish, finely veined. Calyx mostly dark purple. Legume above an inch long, cylindrical, pendulous, black.—Root dried and chewed by the Highlanders. Leaves vary much in breadth.

9. LATHYRUS.

(Nat. Ord. Leguminosœ, Hook. Scot. 2. p. 267.)


Hab. Meadows, pastures, hedges, very common. July, August. 7.

Meadow Vetchling.—Root creeping. Stems slender, climbing, 2-3 feet long, acutely angular. Leaves with one pair of lanceolate 3-nerved, glabrous leaflets. Stipules unequally sagittate. Flowers yellow, rather large, in a second racemed head; peduncle very long. Legumes glabrous, erecto-patent, blackish.


Narrow-leaved Everlasting Pea.—Stems 3–6 feet long, climbing, glabrous, broadly winged. Leaves on a winged petiol, which terminates after producing one pair of glabrous, ribbed leaflets, in a 3-branched tendril. Flowers on long peduncles, in a short clustered raceme, large, purplish, more or less tinged with green, veined. Calyx glabrous. Legume large, drooping, tawny.—This plant is doubtfully wild in the above station, which by mistake was assigned to L. latifolius in Dr Hooker's Flora Scotiae,
DIADELPHIA.  DECANDRIA.  157

10. VICIA.
(Nat. Ord. Leguminose, Hook. Scot. 2. p. 263.)

* Peduncles elongate, many-flowered.


Wood Vetch.—Stem 3-6 feet long or more, climbing, or, if they have nothing to attach themselves to, forming by themselves large entangled masses, much branched, furrowed, angular. Leaves glabrous, very numerous; leaflets sessile, alternate or opposite, 3-5 pair; petiol ending in a branched tendril. Flowers numerous, on a long peduncle, racemed, whitish, tinged with and veined with blue. Legume glabrous, lanceolate, about 4-seeded.


Tuffed Vetch.—Root creeping. Stems slender, 2-3 feet high, climbing, very leafy. Leaves pinnate; leaflets sessile, numerous, opposite, oblong-lanceolate, pubescent on each side, the petiol terminating in a branched tendril. Flowers blue, very numerous, in a second imbricate raceme, on a rather short peduncle. Legumes glabrous, pendulous.

** Flowers axillary, nearly sessile.


Hab. Corn-fields and pastures, frequent. A small variety grows in the King's Park, resembling in habit the following species. June. ©.

Common Vetch.—Stems varying, above a foot high and climbing, or a few inches and decumbent, pubescent, angular and furrowed. Leaves pinnate; leaflets varying much in size, oblong-lanceolate above, below wider, obtuse, mucronate, more or less pubescent, 2-6 pairs on the petiol, which ends in a tendril. Flowers rather large, blue, purplish or red. Legumes pubescent, horizontal or suberect.—Of great value to the agriculturist.


Spring Vetch.—Stems several, procumbent, 2-6 inches long, branched. Leaves small, pinnate, the petiol ending in a point; leaflets 2-3 pair, pubescent, upper ones oblong or cuneiform, the lower ones obcordate. Sti-

**Hab.** Stony sea-coasts, very rare. Seaside west of N.*Queensferry, G. Don;* (It is still there, Dr Graham, 1829.) June, July. 7/.  
*Rough-podded Yellow Vetch.*—Root creeping. **Stems** about a foot high, branched, weak and diffuse, furrowed, climbing. **Leaves** pinnate, the petiole ending in a branched tendril; leaflets 5–9 pair, elliptic-lanceolate, hairy, especially beneath. **Flowers** large, pale yellow. **Legumes** hairy, compressed.


**Hab.** Bushy places, very common. Sometimes with white flowers, Dr Graham. June, July. 7/.  
*Bush Vetch.*—**Stems** 1–2 feet high, slightly branched, climbing. **Leaves** pinnate, the petiole ending in a tendril; leaflets 5–7 pair, dark green, pilose, sometimes emarginate. **Flowers** purplish blue, 3–4 or even 5 together, subpedicellate. **Legumes** erecto-patent, glabrous 2–4. **Seeds** smooth.

11. **ERVUM.**

*(Nat. Ord. Leguminosæ, Hook. Scot. 2. p. 268.)*


**Hab.** Corn-fields and pastures, frequent. King’s Park, (abundant by the road from St Leonard’s to Duddingston), Mr Yalden. June. 7/.  
*Hairy Tare.*—**Stems** slender, climbing or subprostrate, 6 inches to above 2 feet long, weak, slender, subglabrous. **Leaves** pinnate, the petiole ending in a branched tendril; leaflets 5–9 pair. **Flowers** very small, 3–7 on longish axillary peduncles, white, tinged with purplish blue. **Legumes** hairy, pendulous, 2-seeded.

12. **ORNITHOPUS.**

*(Nat. Ord. Leguminosæ, Hook. Scot. 2. p. 268.)*


**Hab.** Dry sandy pastures, rare. North Queensferry, Dr Graham. June. 7/.  
*Common Bird’s-foot.*—**Stems** more or less prostrate, 3–6 inches long, branched, slender, spreading. **Leaflets** 6–9 pair, with an odd one, oval, pilose. **Flowers** very small, white, veined with pink, forming a small head on axillary peduncles. **Legumes** 3–5, jointed, curved, and resembling a bird’s foot, whence the generic name.
13. ASTRAGALUS.

(Nat. Ord. Leguminosae, Hook. Scot. 2. p. 268.)

* Keel of the corolla ending in a straight point.


Hab. Dry mountains and hilly pastures. Hills a little to the west, above N. Queensferry, Maughan. July. l.

Hairy Mountain Milk-Vetch.—Root woody. Leaves beautifully silky, pinnate, the petiol not deciduous, but becoming woody; leaflets numerous, ovate, acute, with an odd one. Scape 2-5 inches high. Flowers large, in a terminal cluster, 4-7, purple, rarely white. Calyx clothed with white (or black, Sm.) hairs, and accompanied by a bract of its own length. Legume turgid, black, covered with appressed hairs.—White variety also, found by Mr Maughan in the same station.

** Keel of the corolla obtuse.


Hab. Hilly pastures and sandy downs by the sea. King’s Park; Musselburgh Sands, Lightfoot. Near Granton, on the coast, Maughan. With a white flower and a foot high, a little west of Kirkcaldy by the sea-side. July. l.

Purple Mountain Milk-Vetch.—Root creeping. Stems several, slightly branched, procumbent, or suberect when growing among low bushes, 3-12 inches long. Leaves pinnate; leaflets very numerous, small, ovate, slightly hairy beneath. Flowers purple, rarely white, capitate, on axillary peduncles, 2-6 inches in length. Calyx twice as long as the bracteae, clothed with black and white hairs intermixed. Legumes ovate, turgid, canaliculate on the back, hairy.


Hab. Woods, rare. Coryton woods, Dr Parsons. Banks of the Water of Leith between Colbridge and Saughtonhall; many places on the coast between Nether Cramond and Queensferry, Maughan. July. l.

Sweet Milk-Vetch.—Stems branched, flexuose, furrowed. Leaves spreading, pinnate; leaflets 5-7 pair, with an odd one, oval, rather large, subpilose beneath, bright green. Flowers numerous, yellow, on axillary peduncles. Calyx glabrous. Legumes inflated, curved, an inch long. Seeds 8-10.

14. TRIFOLIUM.

(Nat. Ord. Leguminosae, Hook. Scot. 2. p. 269.)

* Flowers racemose. (Melilotus.)

1. T. officinale, flowers racemed, legumes naked, 2-seeded, rugose; leaflets obovate-oblong, toothed, stem erect. Lightf.
DIADELPHIA. DECANDRIA. ASTRAGALUS.


**Flowers more or less capitate.**

† *Legumes* many-seeded.


**Hab.** Barren sandy pastures, rare. At Maitland Bridge between Edinburg and Musselburgh, Lightfoot. Fisherrow and Musselburgh Links, Maughan. June. ©.


**Hab.** Meadows and pastures, very common. May—September. 71.

**White Trefoil or Dutch Clover.**—Stems prostrate, 6–18 inches long, rooting, glabrous. *Leaves* on long petiols; leaflets on very short partial ones, roundish or obcordate, serrulate, glabrous, often marked with a transverse pale or dark line. *Flowers* in a dense round umbellate head, whitish, becoming deflexed after flowering. *Legumes* glabrous, oblong, 3–4-seeded. —The Shamrock of the Irish.

†† *Legumes* 1-seeded, covered by the calyx.

= Standard of the corolla deciduous. (Flowers purple, redish, or whitish.)


**Hab.** Meadows and pastures, very common. June—September. 71.

**Common Purple Clover.** —Stems 1–2 feet high, suberect, branched. *Leaves* on longish petiols; leaflets subsessile, elliptical, oval or sometimes roundish-oval, subentire, glabrous, often marked with a whitish lunulate spot. *Stipules* ovate, connate, awned. *Flowers* in a large head, fragrant. *Calyx* hairy. *Standard of the corolla* much longer than the wings. —Well known to the farmer as a valuable artificial grass.

* This species is placed by Lamarke, Decandolle, and Hooker (Curt. Fl. Lond. ed. 2.), in the genus Trigonella.

**Hab.** Fields, waste places, road-sides, frequent. Road-sides near Liberton. July, August. 2.


**Hab.** Dry pastures and waste gravelly places. King’s Park, Mr Yalden. Debris of Salisbury Crags, abundant. July, August. 0.

Hare’s-foot *Trefoil.*—Stems several, suberect, branched, pubescent. Leaves on very short petiols; leaflets linear-obovate, hairy. Flowers very minute, whitish or pinkish, crowded into many dense cylindrical heads, which are remarkably hairy from the long, pink, bristly teeth of the calyx.


**Hab.** Dry banks and pastures, especially near the sea. Near Edinburgh, Dr Parsons. King’s Park. June, July. 0.

Rough *Trefoil.*—Stems several, prostrate, spreading; rigid, hairy. Leaflets obcordate, subdenticulate, hairy. Stipules lanceolate, pilose, connate. Flowers minute, in dense ovate heads, whitish or pinkish, but little longer than the calyx, which is hairy, and has sharp lanceolate teeth, which gradually become recurved and very rigid.


**Hab.** Dry pastures. King’s Park, abundant. Lightfoot. Banks facing the sea at N. Queensferry, plentiful. June. 0.

Soft knotted *Trefoil.*—Stem several, procumbent, 3–3 inches long, spreading, pilose. Leaflets ovate or cuneiform, subdenticulate, covered with a soft pubescence. Stipules ovate, broad, mucronate. Flowers minute, reddish, in dense ovate heads. Calyx furrowed, somewhat ventricose; teeth unequal, not recurved.—Plant very soft to the touch.

DIADELPHIA.  DECANDRIA.  LOTUS.


Strawberry-headed Trefoil.—Stems prostrate, 6–16 inches long, glabrous. Leaves on long, glabrous, erect petioles; leaflets obovate, emarginate, glabrous, denticulate or subentire, finely ribbed with the branched veins. Flowers reddish, slender, on a long peduncle. Calyx very much inflated after flowering, very striking.—Habit much resembling T. repens.

++ Standard of the corolla persistent, scariose. (Flowers yellow.)


Hop Trefoil.—Stems many, procumbent or slightly ascending, 4–12 inches long, more or less pubescent, mostly simple from the base. Leaves on short petioils; leaflets obovate, denticulate, glabrous, middle one on a partial petioil more than half the length of the main one. Flowers in oval heads, yellow, the permanent standard becoming deflexed, dry and scariose, densely imbricated downwards, and changing to rich chestnut-colour.


Slender Yellow Trefoil.—Stems procumbent, or ascending when growing among other plants, subglabrous, slender, slightly branched, 6–18 inches long. Leaves on short pubescent petioils; leaflets obovate or obcordate, glabrous, denticulate, the middle one sessile, or on a short partial petioil. Flowers pale yellow, rather slender, very few or many, in small heads. Standards persistent, becoming reddish and deflexed, not imbricated nor so broad as in the preceding.

I cannot find sufficient difference between T. filiforme and minus to make them even varieties. The middle leaflet is both sessile and petiolate on the same specimen in both plants, and is so represented in E. B. t. 1257. at T. filiforme. The teeth of the calyx, said by Sir J. E. Smith to be glabrous in the same plant, are figured in E. B. slightly hairy in both. The peduncles are pubescent in each; as to the latter being somewhat flexuose or straight, and the heads few or many-flowered, no importance can surely be placed on such characters.

15. LOTUS.

(Nat. Ord. Leguminosae, Hook. Scot. 2. p. 270.)

1. L. corniculatus, heads few-flowered, depressed; calyx pilose; stem decumbent, solid; "claw of the keel obovate," Sm.


Common Bird's-foot Trefoil.—Stems 3–8 inches long, spreading, slightly branched, more or less clothed with appressed hairs. Leaves shortly peltate; leaflets obovate, pubescent, especially beneath. Stipules resembling the leaves. Flowers bright yellow, 4–5 in a depressed, pedunculate head; the peduncle long, erect. Calyx with 5 subulate teeth, hairy. Standard of the corolla streaked with red, often quite red before expansion. "Filaments all dilated below the anther," (Sm.) Legumes narrow, subcylindrical, purplish brown, near an inch long.


Greater Bird's-foot Trefoil.—Stems 1–3 feet high, erect, pubescent chiefly above, quite hollow, branched. Leaves obovate or roundish-obovate, much larger than in the preceding, but similar in other characters. Stipules resembling the leaves. Flowers in depressed heads, 6–12, bright yellow, the standard veined with red. Calyx with the teeth hairy and somewhat denticulate under a lens. "Shorter filaments not dilated like the larger ones under the anther," (Sm.) Legumes spreading, narrow, cylindrical.

16. MEDICAGO.


Black Medick or Nonsuch.—Stems several, procumbent or ascending, 6–18 inches long, somewhat angular. Leaves on short petioles; leaflets ob- ovate, toothed at the apex, subglabrous. Stipules lanceolate, entire. Flowers small, yellow, in small, dense, pedunculate heads. Legumes somewhat spiral, rugged, dark brown or blackish, 1-seeded.

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**XVIII. POLYADELPHIA.**

**I. POLYANDRIA.**

1. HYPERICUM.


* Stems prostrate.

1. H. *humifusum*, styles 3; stem compressed, procumbent; *l.* 2


**Trailing St John’s Wort.**—Stems several, spreading, slender, glabrous, branched, 3-9 inches long. leaves rather small, opposite. Flowers few, small, yellow, delicate. *Calyx* sometimes dotted at the margin, sometimes serrated with glands. *Petals* dotted at the margin.

**Stems erect.**

† Calycine segments entire at the margin.


**Square-stalked St John’s Wort.**—Stem 9-16 inches high, erect, glabrous, branched, the angles often slightly winged. *Leaves* opposite, decussating, obtuse, slightly glaucous beneath. Flowers yellow, rather small, numerous, in terminal corymbose panicles. *Anthers* with a small purplish-black gland.


†† Calycine segments fringed with glandular serrature.


**Hairy St John’s Wort.**—Stem 1-2 feet high, erect, somewhat branched. *Leaves* rather large, opposite, obtuse. Flowers very numerous, in terminal, crowded panicles. *Calyx* segments lanceolate. *Petals* fringed at the apex with black glands, as well as the bracteas and calyx.

5. *H. pulchrum*, styles 3; stems erect, round, glabrous; calyx fringed with glands; leaves cordate, obtuse, glabrous, sub-
Tragopogon. Syngenesia. Polyg. equal. 165


Small upright St John’s Wort.—Stems slender, erect, glabrous, 9-16 inches high, somewhat branched. Leaves rigid, glabrous, roundish or ovate, cordate at the base, opposite. Flowers in terminal, elongate panicles, mostly reddish before expansion. Calycine segments elliptical. Petals glandular at the margin. Anthers red.—Very beautiful.

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XIX. Syngenesia.
I. Polygamia equalis.

1. Tragopogon.


Hab. Meadows and waste pastures. King’s Park, Mr Yalden. Burntisland, Cockenzie, Salisbury Craigs, Mr Arnott. Beach at Caroline Park, Mr Neill. June. ʃ.

Yellow Goat’s-beard.—Root fusiform, milky. Stem 1-2 feet high, glabrous. Leaves alternate, sessile, embracing the stem at the base, linear-lanceolate, ending in a long point. Flowers large, yellow, closing before noon; external florets much longer than the rest, all 5-toothed at the apex. Scales of the involucre in two series, lanceolate, acuminate. Head of pericarps very large. Pappus radiate, feathery, on a long pedicel.

2. Sonchus.


Hab. Banks of rivers and lake-sides, rare. Lochend (a single plant only seen), Mr Neill. July, August. ʃ.

Tall Marsh Sow-Thistle.—Root not creeping. Stems several, 4-10 feet high, nearly simple, furrowed. Leaves long, the lobes narrow, acute, glabrous, but rough and denticulate at the margin, amplexicaul, and divided into two spreading, acute, narrow sagittate lobes. Flowers many, subpaniied, yellow, large. Involucre glanduloso-pilose.


* The calyx of Smith and most others.

**Corn Sow-Thistle.**—Root creeping, milky, fleshy. Stem erect, 2–3 feet high or more, glanduloso-pilose, hollow. Leaves narrow, rather acute; upper cauline ones amplexicaul, and less toothed. Flowers large, deep yellow. "Tube of the florets hairy," (Sm.) Pappus smooth.


Hab. Cultivated fields, gardens, and waste places, very common. June—September. ♄.

**Common Sow-Thistle.**—Root fusiform. Stem 2–3 feet high, branched, hollow, milky; glabrous. Leaves glabrous, succulent, brittle, excessively variable in shape, division, and character of the margin; cauline ones amplexicaul. Flowers small, yellow, only open in fine weather. Peduncles clothed with an evanescent tomentose web. Involucre quite glabrous, dilated at the base after flowering.—Mr Hopkirk has found it with white flowers.

3. **LACTUCA.**


**Strong-scented Lettuce.**—Milky juice abundant. Stem 2–3 feet high or more, very slightly prickly, round. Leaves glabrous, undivided at the base and spreading; the caudine ones amplexicaul, sinuate, sometimes lobed. Bracteas cordate, acuminate. Flowers small, yellow, in a panicle. Involucre imbricate, glabrous. Pappus scabrous, pedicellate.—Smell that of opium, and the milky fluid applied to the same purposes, but said to have peculiar properties.

4. **LEONTODON.**


Hab. Meadows, pastures, waste places, common. May—July. ♀.

**Dandelion.**—Glabrous. Leaves all radical, spreading, bright deep green, the lobes acute. Scape 3–10 inches high, hollow, brittle, exuding, when wounded, an acid, very bitter juice, 1-flowered. Flowers large, bright deep yellow, handsome. Receptacle dotted. Pappus with a very long pedicel, radiate, simple.—Makes an excellent salad, and loses its bitterness when blanched.


APARGIA. SYNGENESIA. POLYG. EQUAL. 167

Marsh Dandelion.—This species differs from the preceding in the outer scales of the involucre being shorter and not reflexed; the flowers and heads of seed-vessels being smaller; the leaves being less runcinate, often not at all so; and the whole plant being more slender. After all, it is a doubtful species, and I have seen some of the scales of the involucre occasionally reflexed.

5. APARGIA.


Hab. Meadows and pastures, frequent. River-side at Rosslyn, Mr Neil. King's Park, Mr Bainbridge. June. 1/2.

Rough Apargia.—Leaves all radical, spreading, ascending, oblong-lanceolate, toothed or subpinnatifid, clothed with rigid, mostly forked hairs. Scape 6-10 inches high, erect, hairy, 1-flowered. Flower large, bright yellow, drooping, and reddish before expansion; the "florets furnished with a tuft of long, yellow, erect hairs at the top of their tube; summit terminating in 5 teeth, at the back of each of which is a triangular cluster of brown glands." (Sm.) Involucre erect, unequal, hairy.


Deficient Apargia.—Leaves all radical, spreading, oblong-lanceolate, toothed, rarely entire, clothed with similar hairs to the last. Scape 6-8 inches high, hairy, 1-flowered. Flowers small, drooping before expansion, and reddish. Apex of the florets not glandular. Outer row of pericarps destitute of down.


Hab. Meadows and pastures, very common. King's Park, Mr Yalden. August. 1/2.

Autumnal Apargia.—Leaves all radical, spreading, irregularly toothed or pinnatifid, smooth or roughish. Scoapes 10-18 inches long, 1-3, spreading, then curved upwards, furrowed, roughish, divided into 2 or 3 branches, and then becoming scaly, hollow. Flowers rather large, yellow. Involucre tapering down into the peduncle.

6. HIERACIUM *.

* Scape 1-flowered.

1. H. pilosella, scape 1-flowered, naked; leaves elliptical-

* Few species of Hieracium have been found in this vicinity, which is the more to be regretted, as Scotland is remarkably rich in them. The Pentland

**Hab.** Dry banks, wall-tops, &c. frequent. King's Park, Mr Yalden. Bank a mile beyond Corstorphine, on the road to Kirkliston. June. 13.

*Mouse-ear Hawkweed.*—Leaves all radical, spreading, whitish beneath. *Scape* 4-7 inches high, hairy, leafless. *Flower* sulphur-coloured, neat and elegant; the florets streaked on the outside with red.—Plant sufficiently marked by the creeping scions, and white under surface of the leaves.

**Stem many-flowered.**

† Cauline leaves few. (1-2.)

2. *H. Lawsoni*, stem slightly branched upwards, clothed, as well as the involucre, with hairs intermixed with black glands; radical leaves petiolate, ovate-lanceolate, glaucous, entire or toothed at the base; the petiols covered with long silky hairs. *Hook*. Fl. Scot. p. 230. *Smith*. E. B. t. 2083.

**Hab.** Chiefly on the mountains. Shady places, almost on a level with the sea, between Pettycur and Burntisland. August. 13.

*Glaucous hairy Hawkweed.*—Stem 10-18 inches high, 1-5 flowered, slightly branched, and bearing 1-2 leaves, clothed with white hairs, more or less mixed with black glands. *Leaves* glaucous, more or less hairy, highly so on the petiols, and often on the nerve beneath, with long white silky hairs; *first leaves* ovate or oblong, obtuse; the others somewhat acute; cauline ones still more so; sometimes the margin subentire, but generally more or less toothed, either at the base or to the very point, the teeth almost patent, wide asunder, rarely deep. *Flower* yellow, rather large.

—Besides the characters of the leaves above detailed, there are others, which can scarcely be relied on as constant, such as the mode of termination at the petiol; some are almost lanceolate, and taper down gradually, but others not in the least, and when that is the case, the base is very frequently unequal.

3. *H. murorum*, stem branched upwards, more or less hairy, the short pubescence of the peduncles and involucre mixed with a few black glandular bristles; leaves not glaucous, ovate or sublanceolate, more or less dentate, slightly hairy, more so on the petiols; cauline ones 1-2, the lower one petiolate. *Lightf.* p. 437. *Smith*, Fl. Brit. p. 830. *Hook*. Fl. Scot. p. 230. E. B. t. 2082.

**Hab.** Walls, old buildings, rocks and banks, common. Salisbury Craigs, &c. July, August.

*Wall Hawkweed.*—Stem 8-20 inches high, scabrous and shortly pubescent, slightly branched upwards in a corymbose manner, and bearing mostly a single petiolate leaf, but when there are 2, the upper one is usually sessile. *Leaves* more or less ovate, petiolate, subentire or toothed, the teeth spreading, hairy or subglabrous, often purplish beneath. *Flowers* rather large, deep yellow, on rather divaricate branches. *Involucre* rough, with

Hills ought to yield some of the more alpine species, and would probably repay the student's search.
black, bristly glands intermixed with a short pubescence, very different from the preceding.

**++ Cauline leaves many.**

4. *Hieracium sylvaticum*, stem branched upwards, with longish white hairs at the base, slightly hairy above, more or less downy beneath the involucre; leaves ovate-lanceolate or lanceolate, toothed or entire, hairy or nearly glabrous; involucre slightly pubescent. *Hook*. Fl. Scot. p. 231. *Smith*, Fl. Brit. p. 831. E. B. t. 2031.

**Hab.** Moist woods; among rocks, &c. Arthur's Seat; and Braid Hill, Dr Graham. August. ˅.

*Wood Hawkweed.*—Stem 1–2 feet high or more, rather slender, very hairy when first rising above the ground, but gradually becoming less so, till at length subglabrous, except at the very base, which has (always?) longish white hairs. Leaves most obtuse at the base, the upper cauline ones being sessile, very lanceolate and acute; all vary in being somewhat hairy, or nearly glabrous. Flowers not large, yellow, somewhat corymbose. Peduncles slender, clothed beneath the involucre with a short white pubescence, which is sometimes almost cottony. Involucre slightly pubescent.

—A variety occurs with the leaves spotted or clouded with purple, which is propagated by seed, and is found in the Highlands. Other varieties depend on the leaves being deeply toothed at the base, almost pinnatifid, which variety I possess also clouded with purple, and have propagated by seed for four years.


**Hab.** Bogs; wet woods and stream-sides, frequent. Rosslyn woods, abundant. August. ˅.

*Succory-leaved Hawkweed.*—Glabrous. Stem 1–2 feet high, furrowed, hollow, often reddish. Leaves quite smooth, amplexicaul, toothed; the teeth large, acute, spreading, or sometimes deflexed. Involucre bristly, with longish black spreading hairs.


**Hab.** Shady and bushy places, rare. Near Cramond Bridge, Mr Neill. August. ˅.

*Rough-bordered Hawkweed.*—Stem 2–3 feet high, usually much branched upwards, striate, hairy, and scabrous; the bristly hairs most abundant on the branches, especially beneath the leaves. Leaves all more or less hairy, most so underneath, and very scabrous at the margin and on the nerves; dark green on the upper, glaucous on the lower surface; lower ones oblong, petiolate; upper ones sessile, semiamplexicaul, more or less toothed, becoming gradually smaller upwards. Flowers in a much branched panicle, numerous, yellow, rather large. Peduncles with a short pu-
SYNGENESIA. POLYG. ÆQUAL. CREPIS.

bescence, intermixed with longish, bristly, pale, spreading hairs. Involucre downy, with pale sub-appressed hairs.


Hab. Shady, rocky, and woody places. Rosslyn and Colinton woods, Maughan. August, September. y.

Shrubby Hawkweed.—Stem 2-3 feet high, striate, stout and woody, hairy, especially below, but sometimes to the very top; hairs long and hispid. Leaves rough with hairs beneath, above subglabrous; cauline ones numerous. Flowers not deep yellow, middle-sized, rather many. Involucre somewhat hairy, rarely nearly glabrous.—According to Sir J. E. Smith, the whole plant in shady, damp situations, is sometimes smooth; a state to which I have never seen it approach.

7. CREPIS.


Hab. Walls; roofs; pastures, &c. common. King's Park, Mr Yalden, July—September. ꞌO.

Smooth Hawk's-beard.—Stem erect, 1-3 feet high, branched, sulcate. Radical leaves more or less runcinate, sometimes rather pinnatifid; cauline ones amplexicaul and sagittate, diminishing in size upwards. Flowers small, yellow, in a lax panicle.

8. HYPOCHÆRIS.


Long-rooted Cat's-eat.—Root long and fusiform. Leaves all radical, rough, narrow-oblong, obtuse. Scapes several, 12-20 inches high, somewhat spreading, rather glaucous, the branches becoming clothed with scattered scales, and a little thickened upwards. Flowers large, bright yellow. Involucre rather long, the leaves keeled, and roughish on the keel. Pappus pedicellate.

9. LAPSANA.


CICHORIUM. SYNGENESIA. POLYG. AEQUAL. 171

HAB. Waste places and cultivated ground, very common. July, August. ♂.

Nipple-scar.—Stem 1-3 feet high or more, erect, furrowed, subglabrous, terminating in a leafy panicle. Radical leaves somewhat lyrate, dentate, hairy, and of a thin texture like the cauline ones. Flowers small, yellow, on very slender peduncles. Involucr glabrous, rigid, the leaves lanceolate, erect. Pericarps not furnished with a pappus.

10. CICHORIUM.
(Nat. Ord. Compos. x, Hook. Scot. 2. p. 237.)


HAB. Fields and waste places, not common. In a field near Foxhall, Maughan. July, August. ♀.

Wild Succory.—Root fusiform, fleshy. Stem 2-3 feet high, erect, branched, leafy, roughish. Radical leaves spreading, long, roughish, succulent. Cauline ones small, cordate, amplexicaul, acute. Flowers large, fine blue, very handsome. Leaves of the involucre mugricate at the back.—A plant much valued on the Continent, according to Sir J. E. Smith and P. Neill, Esq.*, the leaves as food for cattle, and the roots for the table. The leaves also make a good salad in spring, and no doubt would be much improved by blanching; they are produced freely.

11. ARCTIUM.
(Nat. Ord. Compos. x, Hook. Scot. 2. p. 238.)


HAB. Waste places, very common. July, August. ♂.

Common Burdock.—Stem stout, much branched in a bushy manner, 3-4 feet high. Leaves very large and waved, especially the lowest, ribbed and whitish, and downy beneath. Flowers small, purple. Involucr globose, each of the scales ending in a fine hooked spine, which takes firm hold of the coats of animals, a person’s dress, &c.—A variety, if indeed it be not a species, occurs with the scales of the involucr, connected by a cobweb-like down. This A. Bardana, E. B. t. 2478; but is made a variety in Dr Hooker’s Flora Scotica. It is not found near Edinburgh.

12. CARDUUS.
(Nat. Ord. Compos. x, Hook. Scot. 2. p. 238.)

* Leaves decurrent.


HAB. Dry pastures: waste places and road-sides. Fisherton Links; West Pans; about Cockenzie, Maughan. Behind the Castle; and on the coast about Aberlady, abundantly, Dr Graham. July, August. ♀.

SYNGENESIA.  POLYG.  ÆQUAL.  CNICUS.

**Musk Thistle.**—Root fusiform.  Stem 2-3 feet high, somewhat branched.  Leaves narrow-oblong, sinuate, green on each side, spinous at the margin, decurrent and winging the stem interruptedly, the wings spinous.  Flowers solitary, large, purple, smelling strongly of musk in warm weather, drooping, by which this species is well distinguished.  **Peduncle woolly.  Scales of the involucre ending in broad leafy points.**


**Hab.** Waste places, not frequent.  King’s Park, Mr Bainbridge.  North Queensferry; and about Portobello; sometimes with white flowers.  June, July.  

**Welted Thistle.**—Stem 2-4 feet high, interruptedly winged by the decurrent leaves, branched.  Leaves oblong, very sinuate, green on both sides, slightly hairy, spinous at the margin.  Flowers small, in terminal clusters, scarcely sessile, deep purple.  **Involucre globose, about the size of a hazel nut.**


**Hab.** Waste places, frequent near Edinburgh.  June, July.  

**Slender-flowered Thistle.**—Stem 3-4 feet high, broadly winged by the decurrent leaves, branched.  Leaves very green, woolly beneath, sinuate, spinous.  Flowers in mostly terminal clusters, sessile, small, pale purple or whitish.  **Scales of the slender involucre, plane, glabrous.**

**Leaves sessile.**


**Hab.** Waste places and road-sides, not frequent.  West side of the Castle Rock, Dr Parsons.  King’s Park (near Duddingston Loch), Maugham.  Between Kinghorn and Kirkcaldy.  July.  

**Milk Thistle.**—Stem 3-5 feet high, stout, glabrous, branched.  Leaves, bright, shining green, beautifully variegated with broad, white, anastomosing veins; the radical ones large and spreading; cauline ones sessile, recurved; all armed with strong spines.  Flowers terminal, solitary, large, purple.  The large, terminal, recurved spines of the scales of the involucre very striking, near an inch long.

13.  **CNICUS.**


*Leaves decurrent.*

1.  **Cn. lunceolatus**, leaves decurrent, pinnatifid, hispid, the segments divaricate, spinose; involucre ovate, tomentose, the
scales lanceolate, spreading.  


Hab. Fields and road-sides, very common. July, August.  

*Speckled Thistle.*—Stem 2-4 feet high, erect, stout, branched. *Leaves* hispid above, tomentose beneath; *radical ones* large, spreading, the lobes ending in a sharp long spine; *cauline ones* decurrent, and winging the stem, spinous. *Flowers* large, purple, solitary, terminal.


*Marsh Thistle.*—Stem 3-5 feet high, erect, branched, winged; *leaves* with abundance of short spines. *Leaves* long, narrow, *sinuate-pinnatifid*, the margin fringed with spines. *Flowers* dark purple, small, in terminal clusters. *Involucres* mostly ovate, but sometimes nearly globose, the scales shortly mucronate.—*Flowers* sometimes white.

**Leaves sessile.**


Hab. Pastures and road-sides, very common. July.  

*Creeping Thistle.*—Root creeping, very difficult to eradicate. *Stems* 2-3 feet high, branched, rounded. *Lower leaves* spreading, long, very sinuate and spinous; *upper ones* lanceolate, sometimes slightly decurrent. *Flowers* in clusters, somewhat panicled, small, of various purple shades, or white.—*A most pernicious weed.*


*Woolly-headed Thistle.*—Stem 3-5 feet high, stout, furrowed, branched. *Lower leaves* very large, (near 2 feet long), green and scabrous above, white and woolly beneath; *upper ones* gradually smaller; the segments ending in a sharp spine. *Flowers* terminal, solitary, very large, purple. *Involucres* of great size, exceedingly woolly between the scales.

5. **Cn. heterophyllus**, leaves amplexicaul, lanceolate, ciliatodentate, undivided or subpinnatifid, white and downy beneath; *flowers* 1-3. *Hook.** Fl. Scot. p. 237. **Carduus heterophyllum**.
14. ONOPORDON.

(Nat. Ord. Composite, Hook. Scot. 2. p. 239.)


*Cotton Thistle.* — Plant clothed with a white woolly down, easily rubbed off. *Stem* 4–5 feet high, winged by the decurrent leaves, margin of the wings spinous. *Flowers* large, solitary, terminal, purple. *Involucre* globose, depressed, large; the scales very numerous, spreading, and ending in spines.

15. BIDENS.


Hab. Lake-sides and ditches. Lochend, near the house, Mr Neill. Duddingston Loch, Dr Graham. June—August.

*Nodding Bur-Marigold.* — Stem 1–2 feet high, erect, branched, slightly hispid. *Leaves* opposite, amplexicaul, undivided, acuminate, deeply and often unequally serrate. *Flowers* yellow, solitary, pedunculate, surrounded by a number of bracteas, longer than the involucre. — Flowers rarely furnished with ligulate marginal florets; these I have not observed in Scotland.

16. EUPATORIUM.


Hab. Marshy places and stream-sides. Among rocks below Kinghorn, Lightfoot. West of Burntisland, Mr Neill. Lasswade, Mr D. Stuart. August. 7.

*Hemp Agrimony.* — Stem erect, 2–3 feet high, branched, scabrous. *Leaves* opposite, subpetiolate, the 2 lower leaflets (when there are 5) often rather
remote, thus rendering the leaf somewhat pinnate. Flowers small, pinkish, in a terminal, very crowded corymb. Scales of the involucre oblong, obtuse, the outermost very small. Florets 4–6. Style exserted, deeply cleft.

II. POLYGAMIA SUPERFLUA.

16. ARTEMISIA.


Hab. Muddy places on the sea-coast, rare. By Guillon Loch, Dr Parsons. Banks of the Peffer Burn, near Aberlady, Maughan. Banks of a stream at Luffness Mill, Mr Neill. September. ¶.

Drooping-flowered Sea Wormwood.—Stem a foot high or more, covered with a soft white cottony down, branched. Leaves with all the segments linear, the uppermost ones undivided or irregularly cleft. Flowers in terminal racemes, drooping. Florets very small, few; those of the ray sometimes wanting. Scales of the involucre lanceolate, woolly.


Hab. In similar situations to the last. Along with the preceding at Peffer Burn, and St Mary's Isle, Maughan. September. ¶.

Upright-flowered Sea Wormwood.—Plant covered with a white cottony down, and well distinguished from the preceding, by the flowers being not so regularly racemed, but gathered in a series of small clusters; some sessile, all upright, and not near so long as in A. maritima. Florets of the ray sometimes wanting.


Hab. Waste places and road-sides. About Aberlady; and Queensferry, Dr Parsons. August. ¶.

Common Wormwood.—Stems 1–2 feet high, somewhat tufted, branched, striate. Leaves numerous, the upper ones pinnatifid, at length 3-cleft, the segments of all, obtuse. Flowers yellow, panicked, accompanied by entire, oblong bracteas. Style large, recurved, the stigma cloven.—Plant intensely bitter.


Hab. Waste places and road-sides, very common. August. ¶.

Mugwort.—Stems 3–4 feet high, branched, ribbed, glabrous. Leaves very
176 SYNKENESIA. POLYG. SUPERF. GNAPHALIUM.

dark green, and glabrous above, white, with a cottony down beneath, the segments rather broad, unequally cut. Flowers purplish, very numerous, in leafy, racemed, axillary and terminal spikes or panicles; sub-sessile and ovate, not drooping. Scales of the involucre ovate, downy. Florets few.

17. GNAPHALIUM.

* Flowers dioecious.


Mountain Cudweed.—Plant throwing out leafy, procumbent shoots. Flowering stems 2-6 inches high, erect, leafy, terminating in a corymb of 3-6 flowers. Leaves green and glabrous above, white and tomentose beneath; cauline ones lanceolate. Flowers whitish or pinkish; the inner scales of the involucre elongate, especially in the pistilliferous flowers, which are pinkish.

** Flowers perfect (containing both stamens and pistils).


Hab. Woods and sandy pastures. β, Pentland Hills; Figglet Whins, Mr Neill. August. 7.

Highland Cudweed.—Stem 1-2 feet high, erect, decumbent at the base, slender, branched only from the base. Leaves linear-lanceolate, becoming gradually smaller upwards. Flowers in a short or very long and sometimes slightly compound spike, axillary, 2 or 3 together, sessile, ovate-oblong. “Scales of the involucre oblong, shining, with a broad, brown border.”—I heartily concur with Dr Hooker, and those botanists who consider G. sylvaticum and rectum as one species.


Hab. Damp sandy places, and “wet commons where water has stood in the winter,” frequent. August, September. 0.

Marsh Cudweed.—Stem 6-8 inches high, much branched, white, with a cottony down. Leaves about an inch long, woolly on both sides. Flowers yellowish, small, sessile, shorter than the leaves, in the axils of which they are situate, 2 or 3 together, and forming oblong, woolly, terminal heads.

**Hab.** Dry sandy hills, and road-sides. Blackford Hill, Mr Neill. King's Park, by the road-side from St Leonard's Hill to Duddingston; and abundantly on Musselburgh Race-ground. July, August.  

**Least Cudweed.**—Stems very slender, erect, 2–8 inches high, woolly; branch-ed, chiefly from the first cluster of flowers, sometimes quite simple. *Leaves* erect, almost appressed, very small. *Flowers* small, 3–6 together in clusters, sessile, and sometimes solitary. *Involucres* downy, the scales subulate.


**Hab.** Sandy pastures and waste places, not common near Edinburgh. Arthur's Seat; and Blackford Hill, Mr Neill. June, July.  

**Common Cudweed.**—“Stem 6–8 inches high, erect, with numerous leaves, terminated by a globular head of small ovate flowers, from beneath which, spring 2–3 or more horizontal branches, in a prolific manner, each terminated by a similar head of flowers;” (*Hook.*). Whole plant woolly. *Leaves* erect, small. *Flowers* yellowish.

18. **TUSSILAGO.**


**Hab.** Fields; banks; waste places, very common. March, April.  

**Colt’s foot.**—Scapes appearing before the leaves, about 6 inches high, woolly, clothed with lanceolate scales. *Leaves* all radical, broad, cordate, covered with a cottony substance, which soon disappears and rubs away, very tomentose and soft beneath. *Flowers* bright yellow, about an inch in diameter. *Scales* of the *involucre* linear, erect.—A pernicious weed, striking its roots sometimes to the depth of several feet. *Leaves* dried and mixed with tobacco by the country people.


**Hab.** Sides of streams, very common. April, May.  

**Common Butter-bur.**—Scapes flowering before the leaves appear, 4–8 inches high, elongated while flowering, thick, whitish or pinkish, and furnished with large scales and bracteas. *Leaves* exceedingly large, near 2 feet
broad, and supported by petiols often a yard in height. *Flowers pinkish, in a thyrsus, at first dense, but at length lax, all the florets tubular; on some plants are found imperfect *germens, but with perfect *anthers, while on other distinct plants are found nothing but perfect ones, with imperfect anthers. Hence the two species of many authors.

19. SENECIO.


* Florets all tubular.


Hab. Waste places and neglected gardens, very common. June—September. ○.

** Common Groundsel.—Stem about a foot high, branched. Leaves bright, shining green, linear-oblong, sometimes slightly downy beneath. Flowers small, yellow, in an irregular leafy corymb. **Involucre** cylindrical, glabrous, the scales linear, with their summits black.

** Flowers rayed; the ray rolled back.


** Stinking Groundsel.—Stem 12-18 inches high, branched, diffuse, piloso-glansdulose, viscid as well as the leaves, which are sessile, spreading, pinnatifid and unequally cut. Flowers yellow, in a lax, terminal corymb; the peduncles 1-2-flowered. **Involucre** ovate, the scales linear, hairy.—Plant with a disagreeable smell.


** Mountain Groundsel.—Plant somewhat viscid, but with a less strong smell than the preceding. Stem 2-3 feet high, erect, branched, very straight and wand-like. Leaves spreading, rather finely divided. Flowers twice as small as the preceding, very numerous, widely corymbose, pale yellow, the ray short.

*** Flowers rayed, the ray not revolute.


Hab. Pastures, and road-sides very abundant. July, August. ○.

** Common Ragwort.—Stem erect, very tough, 2-3 feet high, branched, glabrous, or somewhat cottony. Leaves many, deep green and shining or
slightly cottony; the lower ones with broad segments, the upper ones with mostly linear divisions. Flowers forming a wide corymb, large, bright, deep yellow. Involucre glabrous, short and cylindrical.—A common weed with remarkably showy flowers.


Marsh Ragwort.—Stem 2-3 feet high, branched. Leaves glabrous, the lower ones varying from ovate to pinnatifid, the uppermost ones mostly pinnatifid. Flowers larger than in the preceding, not so numerous, and forming a less flat corymb. Rays of the outer florets broader.

20. ASTER.


Sea Starwort.—Glabrous. Stems 8 inches to 2 feet high, hollow. Leaves alternate, entire, obscurely 3-nerved, the lower ones only petiolate. Flowers in a leafy corymb, handsome, the disk yellow, the rays blue or purplish, and numerous, but sometimes wanting.—This plant is the only exception to the generic character, of the outer scales of the involucre spreading.

21. SOLIDAGO.


Common Golden-rod.—Stem 1-2 feet high or more, erect, but often decumbent at the base, angular, pubescent. Leaves petiolate, scabrous; the lower ones obovate or elliptical; the uppermost ones subentire, and frequently recurved. Flowers rayed, yellow, clustered, few, or many, in the form of a branched thyrsus, or a panicle, the rays 5-9, oblong, spreading.

22. DORONICUM.

SYNGENESIA. POLYG. SUPERF. BELLIS.


Great Leopard's-bane.—Plant hairy. Root creeping. Stem 2-3 feet high, slightly branched. Leaves broad, soft and pliable, scabrous. Flowers yellow, rayed, large, handsome, terminal, solitary; the rays long, linear, numerous, spreading, 5-toothed at the apex. Scales of the involucre linear, acute, and hairy.

23. BELLIS.


Habit. Pastures and road-sides, every where. March—October. 7.

Common Daisy.—Leaves all radical, spreading, obovate, crenate, hairy. Scape 2-4 inches high, hairy. Flower with numerous white or pinkish linear, obtuse rays, the disk yellow.

24. CHRYSANthemum.


Habit. Banks and pastures, common. June, July. 7.

Great white Ox-eye.—Stem erect, 12-18 inches high, slightly branched, furrowed, somewhat hairy. Leaves subglabrous, deep green. Flowers terminal, large, solitary, with numerous oblong white rays, the disk bright yellow. Margin of the obtuse scales of the involucre, scarios.


Habit. Corn-fields, (usually common, but, to the credit of the farmers around Edinburgh, very rare in the neighbourhood). August. 7.

Corn Marigold.—Glabrous, glaucous. Stem 1-2 feet high, branched, sometimes diffuse, the branches thickening beneath the flowers. Leaves oblong, rather acute, remotely cut towards the extremity, toothed at the base; rarely entire. Flowers large, fine, deep, bright yellow, solitary, terminal, the disk of the same colour as the rays. Scales of the involucre very broad, scarios at the margin.

25. PYRETHRUM.

(Nat. Ord. Composite, Hook. Scot. 2. p. 244.)


Common Feverfew.—Stem erect, much branched, 2 feet high or more, fur-
Matricaria. Syngenesia. Polyg. Superf. 181


Hab. Corn-fields and waste places, rather rare. King’s Park, Mr Yalden. June—August. ☸.

Wild Chamomile.—Stem erect, branched, about a foot high, yellow, glabrous. Leaves sessile, somewhat amplexicaul, glabrous, deep green, the leaflets narrow, linear, sometimes capillary. Flowers small (fths of an inch broad), terminal, and solitary; the ray white, spreading, truncate, the disk yellow, conical.—Smell weak, and taste slightly bitter.


Corn Chamomile.—Stem erect, much branched, covered with a hoary pu-
182 SYNGENESIA. POLYG. FRUSR. CENTAUREA.

bescence. Leaves hoary green, the segments short, linear-lanceolate. Flowers large, terminal, solitary, the ray broad, white, at length reflexed, the disk yellow, at length conical. Peduncles often with small leaves, long. Scales of the involucre obtuse, the inner ones large.


Stinking Chamomile.—Stem a foot high or more, branched, glabrous. Leaves bipinnatifid, the segments cut, bright green, sometimes slightly pilose. Flowers rather small, terminal, the rays white, oval, "reflexed at night" (Sm.), the disk yellow, convex.—Plant with a foetid smell, and sprinkled, according to Dr Hooker, with minute glands.

28. ACHILLEA.


Sneeze-wort.—Root creeping. Stem erect, 1–2 feet high, glabrous. Leaves glabrous, undivided. Flowers about half an inch in diameter, in a flatish, terminal corymb; the rays short, truncate, white, as is also the disk.


Han. Pastures and road-sides, very common. June—August. ♀.

Common Yarrow.—Root creeping. Stem erect, 1–2 feet high, hairy. Leaves spreading, narrow, very much divided into linear leaflets and segments, the latter mucronate. Flowers small, white or pinkish (both the ray and the disk), numerous, in a flatish, branched, terminal corymb.

III. POLYGAMIA FRUSTRANEA.

29. CENTAUREA.


Han. Meadows and pastures, very common. July, August. ♀.

Black Knapweed.—Plant tough, rigid, and scabrous. Stems 1–3 feet high, branched, angular. Lower leaves petiolate, spreading, sometimes simply lanceolate and toothed; cauline ones ovate, entire. Flowers without
rays, terminal, solitary, purple, rarely white, near an inch broad. *Involute* globose, the scales blackish.


*Hab.* Corn-fields, frequent. July. 0.

*Corn Blue-bottle.*—Stem erect, much branched, cottony, 2–3 feet high. *Leaves* alternate, distributed over the whole plant, cottony beneath. *Flowers* large, terminal, solitary; the disk purple, the rays infundibuliform, fine blue, cleft into sharp segments. *Involute* ovate, greenish. *Peduncle* thickened upwards.


*Hab.* Pastures, corn-fields, and waste places, not frequent. Common in Fife, Mr Neill. Road-side between Guillon and Dirleton; Corn-fields west of Largo, Maughan. Near Aberlady, Mr Arnott. July, August. 0.

*Greater Knapweed.*—Stem 1–3 feet high, erect, furrowed, much branched. *Leaves* slightly pilose on each side. *Flowers* large, handsome, terminal, solitary, purple. The florets of the ray elongated, and deeply cleft into linear segments. *Involute* globose, the scales broad, cottony, blackish; “in time they become reflexed and conspicuous at a distance, being of a most beautiful silvery hue,” (Sm.)

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**XX. GYNANDRIA.**

I. **MONANDRIA.**

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1. **ORCHIS.**


* Tubers 2, undivided.


*Meadow Orchis.*—Stem 6–12 inches high, leafy. *Leaves* amplexicaul, lanceolate, shining, paler, or silvery beneath. *Flowers* purple, not numerous, in an obtuse, rather lax spike, accompanied by bracteas about equal in length to the germen. *Segments* of the perianth connivent; the two outer ones greenish at the base, and striated with green. *Nectary* with a spur not so long as the germen, and a large *lip*, whitish in the middle, and spotted with purple.

*Hab.* Woods, meadows and pastures, frequent. Hunter's Bog in the King's Park, Dr Graham. Rosslyn woods, &c. Sometimes with white flowers. May, June. [Image 0x0]

*Early Spotted Orchis.*—Stem 8-12 inches high. *Leaves* broadly lanceolate, shining, more or less spotted with purple. *Flowers* purple, in an oblong, obtuse, lax spike. *Bracteas* lanceolate, purple, rather shorter than the germen. *Inner segments of the perianth* connivent, the lip broad, with the lateral lobes the largest, and reflexed, white and spotted in the middle. *Spur* of the *nectary* linear-conical, longer than the germen. *Anthers* purple, the *pollen-masses* yellow.

**Tubers 2, palmate.**


*Hab.* Marshes and moist meadows, frequent. About Comely Bank, Mr Neil. Duddingston Loch, Mr Bainbridge. Hunter's Bog, Dr Graham. Rosslyn woods, abundant. June. [Image 0x0]

*Marsh Orchis.*—Stem 12-18 inches high, leafy, hollow. *Leaves* long, somewhat erect, acuminate, sheathing the stem nearly to the top, varying in breadth from half an inch to one inch and a half, mostly without spots, but sometimes with faint ones. *Flowers* various shades of purple or pale red, rarely white, in a rather dense spike, and accompanied with long lanceolate bracteas. *Lip* spotted and streaked with dark purple. *Spur* incurved, shorter than the germen.


*Hab.* Meadows and pastures, frequent. King's Park, Mr Yalden. Duddingston Loch with red flowers, and at Pigget Whins surrounded by seedling plants with undivided bulbs, Dr Graham. June, July. [Image 0x0]

*Spotted palmate Orchis.*—Stem 10-16 inches high, slender, leafy. *Leaves* lanceolate, distant, spotted with purple, becoming more attenuate upwards, at length nearly subulate. *Flowers* spotted, mostly pale whitish purple, sometimes darker, at others quite white, and free from spots, numerous, in a dense, oval-pyramidal spike. *Lip* large, not regular in figure, but the middle lobe usually the longest. *Bracteas* small, subulate.

2. GYMNADENIA.


1. *G. Conopsea.*

Habenaria. Gynandra. Monandria. 185

Hab. Bogs and moist pastures, rare near Edinburgh. In meadow-ground south of Dalmahoy Hill, with white flowers, Messrs Sommerville and E. Maughan. Hills near the toll, North Queensferry, Mr Neill.
June—August. ¶.

Fragrant Gymnadenia.—Stem 9-16 inches high. Leaves linear-lanceolate, keeled. Flowers purple, flesh-colour or (rarely) white, rather few or very numerous, in a linear-oblong spike, which, according to the number of flowers, is very lax or very dense. Bracteas a little longer than the germs. The 3 upper and inner segments of the perianth connivent, the 2 lateral ones narrow and patent, or reflexed. Lip cleft into 3 equal, entire lobes, not spotted. Spur slender, as long again as the germs.

"The 2 cells of the anthers are perforated at the base, through which the naked, large, and oblong glands of the stalks of the pollens-mass appear." (Hook.) Pollen-mass green.—Flower very fragrant.

3. HABENARIA.

(Nat. Ord. Orchideæ, Hook. Scot. 2. p. 163.)


Hab. Dry hilly pastures. Caroline Park; and Cramond Island, Maughan. By the upper reservoir on the Pentland Hills, G. Don. About Burntisland, and on Dunearn Hill, Mr Neill. Pentland Hills, near Currie, Mr Arnott. Ravelrig-toll Moss, Dr Graham. Near St Anthony’s Chapel in the King’s Park, Mr D. Stuart. June, July. ¶.

Frog Habenaria.—Stem 4-10 inches high, leafy. Lower leaves broadish and obtuse, the upper ones narrower, and somewhat acute. Bracteas lanceolate, at least half as long again as the flowers. Flowers green, in a lax spike. Segments of the perianth connivent, brownish at the points. Lip bent downwards, linear-oblong, yellowish or brownish. Anther purplish. Pollen-mass yellow.


Hab. Hilly and alpine pastures, very rare near Edinburgh. Breich water-side south from Whitburn, Dr Fleming. A single plant found growing along with the preceding species, on the hills above North Queensferry, by Mr Paleonar and myself. July, August. ¶.

Small White Habenaria.—Stem 6-10 inches high, leafy, striate. Lower leaves obtuse, spreading; upper ones lanceolate, erect, keeled, striate. Bracteas longer than the germs. Flowers numerous, small, white, in a dense, narrow spike, about 2 inches long. Segments of the perianth broad, subconnivent. Lip a little longer than the perianth, somewhat deflexed. Anther yellowish. Pollen-mass yellow.


4. LISTERA.


Common Twayblade.—Stem 12-18 inches high. Leaves large, ovate or roundish-ovate, ribbed, below the middle of the stem. Bracteas shorter than the pedicel. Flowers green, small, pedicellate, in a narrow, long, lax spike. Segments of the perianth spreading, the points somewhat inflexed, the two inner ones narrower than the rest. Lip long, yellowish green, slightly deflexed, bifid.


Heart-leaved Twayblade.—Stem very slender, 3-6 inches high. Leaves small, not an inch long. Bracteas minute. Flowers brownish green, few, very small, pedicellate, in a small lax spike. Segments of the perianth spreading, the 2 inner ones the smallest. Lip long, the 2 segments divaricate. Capsule globose.


5. EPIPACTIS.


1. *E. latifolia*, leaves ovate, amplexicaul; lower bracteas

Hab. Woods and borders of fields. Dalhousie woods, Maughan.

Broad-leaved Helleborine.—Root composed of long, fleshy, simple fibres. Stem 1-2 feet high or more, green, leafy. Leaves broadly ovate, and sheathing below, lanceolate and sessile above, at length resembling bracteas. Lower bracteas longer than the flowers. Flowers numerous, in a long lax spike, greenish purple or purplish. Segments of the perianth more or less connivent; the outer ones ribbed. Lip a little shorter than the perianth, broad, concave, and seeming as if jointed in the middle. Anther yellow. Pollen-masses oblong, farinaceous. Capsule pyriform, ribbed.

6. **CORALLORRHIZA.**

(Nat. Ord. Orchideæ, Hook. Scot. 2. p. 190.)


Hab. Moist mossy woods, very rare. Peat-bog near Ravelrig-toll, among the willows, Mr. E. Maughan. June, July. 2.

Spurless Coral-root.—Root composed of a mass of thick, whitish, fleshy, branched, and very brittle processes. Scape 6-12 inches high, striate, closely sheathed with 2 or 3 long scales. Bracteas minute. Flowers few, in a lax spike, subpedicellate, greenish. The 3 uppermost segments of the perianth connivent; the 2 lateral ones deflexed. Lip white, spotted with red, oblong, entire, deflexed. Spur wanting. Anther "terminal, resembling an operculum, moveable, deciduous, sessile, fixed to the posterior margin of the stigma." (Hook.) Capsule oblong-pyriform, twisted.—1 possess a highly curious monstrosity of this plant from Ravelrig-toll. In all the flowers on one individual, the 2 outer of the 3 upper connivent segments of the perianth are converted into lips, as large as the true lip, deflexed, and beautifully spotted; the 3 remaining segments appear between them like a triphyllous calyx, and the long column of fructification stands in the centre wholly unprotected, and terminated by the anther.

XXI. **MONOECA.**

I. **MONANDRIA.**

1. ZANNICHELLIA.

(Nat. Ord. Fluviales, Hook. Scot. 2. p. 103.)


Hab. Ditches and ponds. Lochend, Mr Neill. In a small pool near Luffness. August. 0.

Horned Pondweed.—Stems long, filiform, floating, branched, glabrous. Leaves numerous, opposite, linear, entire. Bracteas membranaceous. Flowers
MONOECIA. MONANDRIA. CALLITRICHIE.

axillary, minute, the pistilliferous ones having an involucre and a very short pedicel; the stamen arising from the base without a perianth, bearing a 4-celled anther upon a long filament. Styles short, the stigma dilated.

2. CALLITRICHIE.

1. *C. aquatica.*
*C. verna and autumnalis,* Lightf. p. 70.

Hab. Ditches and ponds, and small streams, very common. April—October. *Z.*

*Water Starwort.*—Stems varying greatly in length according to situation, filiform and branched, rooting freely. *Leaves* varying also in size and shape, of all forms, between linear and obovate; when growing in deepish water, these beneath are narrow, those on the surface broad, and expanding in the manner of a star, at the summit of each branch. *Flowers* minute, and inconspicuous; *stameniferous ones* having a single *stamen,* with a yellow anther on a slender white filament, issuing from a minute 2-leaved white perianth; *pistilliferous ones* with a similar perianth, the styles 2, capillary, reflexed. *Pericarp* roundish, 4-lobed, 4-celled.

3. ZOSTERA.


*Common Grass-wrack.*—Stems 1–3 feet long, rooting at the joints, and furnished with abundance of long, linear, bright green, floating grass-like leaves, sheathing at the base, and 1–4 lines broad. *Flowers* in a spadix. "*Spadix* linear, arising from a sheathing portion of the leaf, which thus forms the *spatha.* *Flowers* all on one side of the *spadix,* quite destitute of perianth, in 2 rows. *Pistils* and *anthers* alternate, in general 2 anthers, and then 1 pistil; both ovate or obtlong-ovate, the former tipped with a bipartite, long, filiform style; both are green. *Anthers* bursting irregularly." *(Hook.)* Sir J. E. Smith says, "*Zostera* is easiest understood, as a simple unilateral spike of naked flowers disposed in 2 ranks."
—Used by the poorer classes in the north for bedding, and to pack brittle ware. The collecting of it is encouraged by the Highland Society for stuffing mattrasses; great quantities being imported for that purpose.

II. TRIANDRIA.

4. TYPHA.
*(Nat. Ord. Aroideae, Hook. Scot. 2. p. 192.)*


Hab. Sides of ponds and streams. Lochend, Maughan. July. *Z.*

*Great Cat’s-tail or Reed-Mace.*—Glabrous. Root creeping. Culm 3–6 feet
high, simple, straight, round, leafy below. Leaves very long, erect, near an inch broad, acute. Catkins long, terminal; the upper one yellow, sterile, and furnished with 1–3 membranaceous bracteas; the lower one greenish brown, fertile, very dense.

5. SPARGANUM.  
(Nat. Ord. ARIDAEZ, Hook. Scot. 2. p. 191.)


HAB. Ponds and ditches. Duddingston Loch, Dr Graham. Lochend, Mr Neill. July. ?

Branched Bur-reed.—Glabrous. Root creeping. Stem round, 2–3 feet high, divided above into a few divaricate, short branches. Leaves long, linear; those of the stem shorter, more or less sheathing. Flowers forming globular, sessile heads; the sterile ones above, yellow; the fertile ones greenish, below. Anthers on longish exserted filaments. Germens with the style at length forming prickly heads as large as a hazel-nut.


HAB. Ponds and ditches. Ditches near Corstorphine; and small lake on the summit of Dunearn Hill, Mr Neill. July. ?

Simple upright Bur-reed.—Glabrous; less than the preceding. Stem 1–2 feet high, round, unbranched. Leaves similar to the last, but not so long, and differing, in the sides of the triangular base being plane instead of concave. Heads of flowers very similar to the last, but all sessile, on one common stalk, except the lowest one or two, which are sometimes on a very short peduncle. Prickly fruit-bearing heads also similar.—Light-foot comprehended this and the preceding under the common name of Erectum, but mentions the present species as the most common variety.


HAB. Ditches and ponds, chiefly in the Highlands. Loch on Dunearn Hill, Mr Neill. Peat-pits on the south side of Dalmahoy Hill, Maughan. Pentland Hills near Currie, Dr Graham. July. ?

Floating Bur-reed.—Stems round, very leafy, varying much in length. Leaves very narrow, linear, grass-like, somewhat pellucid, long and floating. Flowers in globular heads, which are all sessile, except the lowermost, which, as in the preceding, is shortly pedunculate; fertile heads small, even when mature. Stigma short.

6. CAREX.  
(Nat. Ord. CYPERACEZ, Hook. Scot. 2. p. 174.)

DIV. I. Spike diacces; simple and solitary, both on the sterile and fertile culm.

1. C. dioica, spike simple, diaceous; fruit ascending, ovate,


**Straight-fruited dioecious Carex.**—Root creeping. _Culms_ 4–8 inches high, slender, simple, triquetrous. _Leaves_ setaceous, somewhat triquetrous, erect, shorter than the culm. Both sterile and fertile spikes oblong, small. _Glumes_ obtuse, with a green keel, broader in the fertile spike. _Stigmas* 2.


**Recurved-fruited Dioecious Carex.**—Root not creeping. _Culms_ 6–12 inches high, slender, rough. _Leaves_ setaceous, much shorter than the culm. _Spike_ linear-oblong. _Glumes_ brown, very scariosive, keeled, brown and shining, especially on the fertile spike. _Fruit_ recurved, as well as deflexed. _Stigmas* 2.—I am almost convinced that the true _C. Davalliana_ does not grow in the annexed stations, as the plants which Mr Maughan himself communicated to me, are decidedly the preceding species, which has sometimes its fruit not only quite patent, but even somewhat deflexed.

**Div. II.** _Culms with a single spike, or many sessile spikelets, which contain both stamens and pistils._ (C. arenaria and intermedia have distinct sterile ones.)

* Spikelets sterile at their extremity. (C. pulicaris has a simple, single spike.)


_Hab._ Bogs, common. Hunter’s Bog, in the King’s Park; and by Hab-ble’s How, Mr Neill. Pentland Hills; and Ravelrig-toll moss. May, June. *f*.

**Flea Carex.**—Root not creeping. _Culms_ 4–10 inches high, filiform, erect, glabrous. _Leaves_ setaceous, rigid, glabrous, shorter than the culm. _Spike_ simple, linear, the fertile flowers below; _fruit_ deflexed, oblong, acuminate, glabrous. _Stigmas* 2. _Glumes_ brown, ovate-acute, keeled, deciduous.


2
Greater prickly Carex.—Root fibrous.  
**Carex** long—18 inches high, triquetrous, the angles scabrous.  
**Leaves** linear, longer than the culm.  
**Spikelets** 8—10, sometimes crowded, at others more distant, ovate or roundish, not often compound.  
**Glumes** ovate, scarioso, with a green keel, a little shorter than the capsule.  
**Bracteas** short, ovate at their base, then setaceous.  
**Fruit** squarrose, varying much in the hispidity of the margin.—Dr Hooker thinks that C. divisa, E. B. t. 629., is only a variety of this species.

5. C. vulpina, spikelets sterile at their apex, numerous, crowded, thrice compounded, obtuse; fruit convexo-plane, ovato-acuminata, squarrose; culm acutely angled.  
**Lightf.** p. 547.  
**Smith, Fl. Brit.** p. 976.  
**Hook. Fl. Scot.** p. 262.  
**E. B. t. 307.**

**HAB.** Bogs; ditch-sides, &c.  
Near Figglet Whins, Mr Neill.  
Stream-side near Luffness, Dr Graham.  
Between Pettycur and Kinghorn, on the sea-side by a spring.  
June.  

Great Carex.—Root fibrous.  
**Culm** suberect, stout, 2 feet high, very acutely 3-sided, the angles sharply scabrous.  
**Leaves** broad, longer than the culm, very rough at the keel and margin.  
**Bracteas** broad at their base, then setaceous, the lower one not half the length of the spike, the rest gradually smaller.  
**Spike** 2—3 inches long, crowded, sometimes interrupted.  
**Spikelets** ovate.  
**Glumes** ovato-acute, with a green keel, as long as the fruit.  
**Margin** of the fruit scabrous, the apex shortly bifid.  
**Stigmas** 2.

6. C. paniculata, spikelets sterile at their extremity, thrice compounded, so as to form a somewhat panicked, rather acute spike; fruit patent, ovato-acuminata; culm acutely triangular; root forming large raised tufts.  
**Hook. Fl. Scot.** p. 262.  
**Smith, Fl. Brit.** p. 978.  
**E. B. t. 1064.**

**HAB.** Bogs and marshy woods.  
Woods behind the village of Newbattle, Dr Graham.  
June.  

Great panicked Carex.—Plant forming large tufts, which often rise 1—3 feet above the ground, a firm mass of roots.  
**Root** fibrous.  
**Culms** 2—3 feet long, erect or spreading, acutely triangular, very scabrous at the angles.  
**Leaves** very numerous, longer than the culm, rough at the keel and margin.  
**Bracteas** short, linear-lanceolate.  
**Spike** compound, somewhat branched, pale silvery brown.  
**Lower spikelets** somewhat remote, ovate.  
**Glumes** ovato-acute, with a hispid keel, and a broad, white, very scarioso margin, which gives a silvery appearance to the whole spike, which is 2—3 inches long.

7. C. teretiuscula, spikelets sterile at their extremity, compounded, coarctate, ovate; fruit patent, ovato-acute; culm rounded between the angles; root not tufted.  
**Smith, Fl. Brit.** p. 977.  
**E. B. t. 1065.**  
**C. paniculata** &c.  
**Hook. Fl. Scot.** p. 263.

**HAB.** Open bogs and marshes.  
North Queensferry, Mr T. Mackay.  
Marsh at the foot of Dundas Hill, Mr Neill.  
Pentland Hills, G. Don.  
Ravelrig-toll moss.  
June.  

Lesser panicked Carex.—Root fibrous, never forming tufts as in the preceding, but throwing up the culms as it were separately.  
**Culms** 12—16 inches high, suberect, with 3 angles, but the spaces between the angles rounded; the angles scabrous.  
**Leaves** longer than the culms, erect; rather rigid,
sheathing the culm for half its length, scabrous at the keel and margin. 

**Brae**

short, setaceous. **Spike** about an inch long, reddish brown, close and compact. **Glumes** with a smooth keel, scarisoie, and with a narrow whitish margin, but not so as to give a silvery hue to the spike.—I certainly may be wrong in considering this species as distinct from the last, to which Dr Hooker has recently united it; but the character of the stem, which is constant, and, above all, the extreme difference in habit when growing, and the peculiarity of the one forming such immense tufts, and the other being scattered and struggling, is so striking, that I cannot avoid thinking them different.

**Upper or intermediate spikelets sterile.**


*Hab.* Sandy banks on the sea-coast, very abundant. Between Caroline Park and Granton, plentiful. June. ,'%.

**Sea-side Carex.**—Root creeping luxuriantly. **Culms** 4–12 inches high, incurved, the angles roughish above. **Leaves** about the length of the culm, sometimes shorter. **Lower brae** foliaceous, not so long as the spike. **Spike** 1–2 inches long, oblong. **Spikelets** ovate, the lower ones somewhat remote; uppermost one sterile, and many of the intermediate ones sterile at their extremities. **Glumes** ovate-acute, as long as the fruit. **Fruit** furnished with a membranaceous margin towards the apex, which is bifid.


*Hab.* Bogs and marshes. Abundant in the Hunter's Bog, King's Park, Mr Neill. Guillon Loch, Mr Arnott. Braid and Pentland Hills; and Banks of Lochend. June. ,'%.

**Soft brown Carex.**—Root creeping. **Culms** erect, 12–18 inches high, acutely triangular, the angles rough. **Leaves** erect, subequal to the culm. **Lower brae** subfoliaceous, not so long as the spike. **Spike** oblong, 1–2 inches long, imbricated with the ovate spikelets; the central spikelets not wholly sterile, but having a few fertile flowers. **Glumes** ovate-acute, as long as the fruit. **Fruit** ovate, acuminate, with a small scabrous margin towards the extremity; the apex bifid.

**Spikelets sterile at their base.**


*Hab.* Bogs and marshes, common. Pentland Hills, Mr Neill. King's Park, &c. May, June. (',')[.

**Little Prickly Carex.**—Root fibrous. **Culms** 6–12 inches high, erect or spreading, triangular. **Leaves** forming a spreading tuft, linear, narrow, roughish at the keel and margin, about as long as the culms. **Brae** very short, setaceous, the longest not half the length of the spike. **Spike**
rarely an inch long, composed of 2-4 small, roundish, few-flowered, prickly spikelets. Fruit convex on the lower, concave on the upper surface, spreading in a stellated manner. Glumes cordato-ovate, with a green keel, shorter than the fruit.


**White Carex.**—Root fibrous. Culms 7-16 inches long, mostly ascending, triangular, rough at the angles. Leaves very narrow, nearly as long as the culms. Bracteas minute, except the lower one, which is often not half so long as the spikelet it accompanies. Spike little more than an inch long. Spikelets very pale, shining, dense, somewhat remote, imbricated with the short ovate fruit. Glumes broader and shorter than the fruit, keeled, scarioso.—Fruit sometimes margined towards the extremity, having 2 teeth at the apex, according to Dr Hooker. Goodenough and Smith describe the apex as entire, which agrees with all my specimens.


**Oval-spiked Carex.**—Root fibrous. Culms about a foot high, triangular, rough at the angles. Leaves linear, narrow, rough at the keel and margin, nearly as long as the culm. Lower bracteas sometimes foliaceous at the apex, but never as long as the spike, frequently all are shorter than the spikelets, and quite scarioso. Spikelets reddish-brown when in fruit, brownish-green when in flower, so approximate as to form a spike scarcely more than an inch long. Lower glumes of each spikelet more scarioso than the upper ones.


**Remote Carex.**—Root creeping. Culms 1-2 feet long, weak and slender, triangular, roughish on the angles. Leaves very narrow, long. Bracteas foliaceous, longer than the spike, narrow, very acuminate, short in the two or three uppermost spikelets. Spike 4-8 inches long, composed of 6-10 small ovate spikelets, the lower ones very distinct. Fruit convexo-plane. Glumes ovate-acute, with a greenish keel.

14. C. axillaris, spikelets sterile at their base, remote, the
lower ones subternate, the lowest bractea longer than the spike, all the rest very short; fruit ovate, acuminate, bifid at the apex. 


**Axillary Clustered Carex.**—Root fibrous. *Culms* above 2 feet high, firm, triangular, scabrous at the angles. *Leaves* linear, long, broader than in the preceding, very rough at the margin and keel. *Bracteas*; the lowest long and foliaceous, the rest scariose, broad at the base, then setaceous. *Spike* 3–5 inches long, composed of 8–10 sessile, ovate spikelets, the lowest two or three of which are remote and more or less compound, the uppermost simple and approximate. *Fruit* much resembling the preceding. *Glumes* ovate-acute, scariose, with a green keel.

**Div. III. Sterile and fertile spikelets distinct on the same culm.**

(*Sterile ones always terminal.*)

* Sterile spikelets mostly single.

† Stigmas 3.

≔ Fertile spikelets long, linear, lax.


Hab. Woods and shady banks of rivers. Rosslyn woods; and the Park at Dalkeith, Maughan. Banks of the Esk, above Melville Castle, Dr Graham. June, July. 〒.

**Great pendulous Carex.**—Root fibrous. *Culms* 2–6 feet long, suberect, firm, triangular, glabrous. *Leaves* broad, glaucescent beneath, rough at the margin and keel. *Fertile spikelets* 5–7, remote, 4–6 inches long; *sterile one* 3–4 inches long. *Bracteas* broad, long, and foliaceous.


**Loose pendulous Carex.**—Root fibrous. *Culms* slender, 2 feet or more high, triangular, acute, rough at the angles, leafy, longer than the leaves. *Leaves* broad, with three main nerves, which are scabrous as well as the margin. *Bracteas* foliaceous, broad, not so long as the culm. *Fertile spikelets* 1½–2 inches long, the fruit rather straggling. *Glumes* ovate-lanceolate, green, with a whitish scariose margin, shorter than the fruit.


Pendulous Wood Carex.—Root fibrous. Culm 2 feet high or more, slender, suberect, triangular, glabrous. Leaves narrow, shorter than the culm. Bracteas foliaceous, similar to the leaves, not rising above the culm. Sterile spikelet mostly single, but there are sometimes two; fertile ones one inch to one inch and a half long, 4–6, erect when in flower, at length drooping on long peduncles, the lowest occasionally compound. Fruit remarkable from its long subulate beak, more close than in the preceding. Glumes ovate-lanceolate, whitish, scarious and silvery, with a broad, green keel, scabrous towards the apex.

++ Fertile spikelets cylindrical-oblong, ovate, or roundish.


Pale Carex.—Root fibrous. Culms 8–13 inches high, erect or spreading, triangular, scabrous at the angles. Leaves narrow, acuminate, pubescent, shorter than the culm. Sheaths of the bracteas very short. Fertile spikelets approximate, on filiform peduncles about half an inch in length, densely imbricated with the glabrous, very obtuse fruit, and varying in form from roundish to cylindrical oblong. Glumes broadly ovate, shorter than the fruit, with a mucronate keel.


Yellow Carex.—Root creeping. Culms 6–12 inches long, erect or spreading, triangular, subglabrous. Leaves about as long as the culm, bright green, broadish. Sterile spikelets sometimes 2; fertile ones of a yellowish colour, approximate, dense, the lower one sometimes very distant. Fruit inflated, acutely rostrate, bifid or entire at the apex. Glumes reddish-brown, shorter than the fruit.—Dr Hooker has, with great propriety, joined C. Gedleri of E. B. t. 1773, to this species, from which it differs merely in the fruit being not recurved, a character to which C. flava is by no means constant.


Long-bracteate Carex.—Root fibrous. Culms 8–12 inches high, obtusely triquetrous, glabrous. Leaves narrow, convolute, about as long as the culm; the bracteas similar, but much longer. Spikelets almost sessile,
and often crowded together. Fruit ovate, glabrous, with a short bifid beak. Glumes broadly ovate, shorter than the fruit.


Hab. Moors and heaths, common. Pentland Hills, very plentiful. June. 3.

Distantly-spired Carex.—Root fibrous. Culms 1-2 feet high or more, erect, somewhat curved, triangular, glabrous except towards the top. Leaves nearly as long as the culm, rough at the margin and nerve. Fertile spikelets oblongo-cylindrical, the lowest often a foot or more from the summit, ½-1 inch long, brownish-green. Fruit glabrous, triquetrous, the keel cleft at the apex into two divaricate teeth. Glumes broadly ovate, reddish-brown, with a green scabrous keel.—I can find no specific difference between C. distans and C. binervis, and have followed Hooker in uniting them.


Hab. Hilly pastures, common. King's Park, Mr Neill. May. 3.

Vernal Carex.—Root creeping. Culms 3-8 inches high, triangular, glabrous. Leaves linear, broadish for their length, acute, shorter than the culm, rough at the margin and keel. Fertile spikelets ovate, dense, erect, the lowest one furnished with a foliaceous bractea, which rarely rises higher than the culm. Fruit subtriquetrous, not bifid at the apex, pubescent.


Hab. Moist hilly pastures and moors. King's Park, and Bevelaw Burn, Maughan. Braid Hill, Dr Graham. June. 3.

Round-fruited Carex.—Root fibrous. Culms mostly weak and curved, 4-12 inches high, triangular, sometimes glabrous, at others roughish towards the top. Leaves shorter than the culm, narrow, linear. Fertile spikelets 2-3, brownish green, ovate-acuminate when in flower, becoming round in fruit. Bracteas foliaceous, linear-setaceous; the lowest never so long as the spike. Fruit becoming blackish, beak short, acute, entire.

24. C. panicea, sterile spikelets single, fertile ones 2-3, remote, oblongo-cylindrical, pedunculate; sheaths of the foliaceous bracteas shorter than the peduncles; fruit rather distant, ovate, inflated, obtuse, with a very minute entire beak. Lightf.

Hab. Wet moors, and marshy pastures. King’s Park; and Pentland Hills, abundant. June. 7/.

Glaucous Heath Carex.—Root very creeping. Culms a foot high or more, triquetrous, glabrous. Leaves very glaucous, rather broad for their length, shorter than the culm, rough at the margin and keel. Sterile spikelet an inch long, linear. Fertile ones densely imbricated with the roundish, somewhat obtuse fruit. Fruit pubescent, becoming at length nearly black, and, from being much crowded, rendering the glumes horizontal, the mucronate points of which give then a peculiar character to the spikelets.

++ Stigmas 2.


Hab. Bogs and marshy pastures, very common. June. 7/.

Tufted Bog Carex.—Root very creeping. Culms 8–16 inches high, slender, triangular, roughish at the angles. Leaves somewhat glaucous, erect, as long as the culm, very narrow. Sterile spikelet an inch long, linear, (sometimes there are 2); fertile ones either approximate or remote, densely imbricated with the fruit. Fruit broad, compressed, glabrous, at first pale green, at length blackish, persistent. Glumes roundish-ovate, very obtuse, black, much shorter than the fruit.


**Sterile spikelets several; (in C. lævigata mostly solitary).**

† Stigmas 2.


Hab. Moist meadows and marshes. Duddingston Loch, on the south side, Mr Neil. Rosslyn woods. May. ‡.

Slender-spiked *Carex*.—Root creeping. Culms erect, 1–3 feet high, triangular, the angles very acute and scabrous. Leaves varying in length, as well as the stem, rather bright green, erect, drooping at the summit, rough at the margin and keel. Fertile spikelets remote, drooping while in flower, at length erect, 1–2 inches long, subsessile, or the lower one on a short peduncle. Fruit compressed, glabrous, striate. Glumes oblong, scarcely acute, dark brown or blackish, with a green keel, shorter than the fruit.

†† Stigmas 3.


Hab. Marshes; pond and stream-sides, common. May. ‡.

Lesser common *Carex*.—Root creeping. Culm about 2 feet high, erect, triangular, scabrous. Leaves glaucous, broad, erect, mostly shorter than the culm, rough at the keel and margin. Sterile spikelets commonly 3; fertile ones about the same number, shortly pedunculate, oblong, and obtuse or acute (as Dr Goodenough observes), according to the absence or presence of a few sterile flowers at the apex. Fruit very distinct from the following, in being shorter, less acuminate, and in having the apex only minutely toothed, instead of being forked.


Hab. Marshes, and by ponds and rivers, common. May. ‡.

Great common *Carex*.—Root creeping. Culms erect, stout, 2–3 feet high, triangular, very acute at the angles, and excessively scabrous. Leaves
broad, erect, glaucous, very scabrous at the keel and margin, nearly as long as the culm. Sterile spikelets robust, about 3, triquetrous, crowded; fertile ones 2-3, robust, 1-2 inches long, oblongo-cylindrical, the 2 lower ones pedunculate, the rest subsessile. Fruit densely imbricate, the teeth at the apex mostly divaricately.

31. C. leuvisgata, bracteas foliaceous, with sheaths shorter than the peduncles; sterile spikelets 1-2, fertile ones 3-5, somewhat drooping, oblongo-cylindrical; fruit ovate, triquetrous, with a long bifid beak; glumes ovato-globose, with a scabrous, mucronate point, as long as, or a little shorter than the fruit.


Large-fruited Bladder Carex.—Root creeping. Culms 1-2 feet high or more, acutely triangular, scabrous. Leaves very long, rising above the culm, rough at the margin and keel; when growing in water they are broader, and sometimes twice the height of the culm, when they are also glaucous. Bracteas rising higher than the culm. Sterile spikelets 2-3, filiform, approximate; fertile ones erect, 2-4, mostly oblong, but sometimes 2 inches long; and cylindrical, remote, pedunculate, except the uppermost. Fruit tawny, closely imbricate, but not so crowded as the preceding, oblong, ending in an acute, subulate, bifid point. Glumes lanceolate, as in the preceding.—I have a curious variety of this plant, with
5 or 6 fertile spikelets, the only sterile flowers being on the terminal spikelet at the apex; the spikelets are all approximate, and the terminal one 3 inches long; the lower bracteae 2 feet, long; all the leaves glaucous. The peculiar characters of this variety were general over a large patch by the side of the lower fish-pond in the park at Ashbourne in Derbyshire.


*Hairy Carex.*—Root creeping. *Culms* erect, 1–2 feet high, triangular, subglabrous up to the lower spikelet. *Leaves* rather broad, pubescent, rough at the margin and keel. *Bracteas* scarcely rising higher than the culm. *Sterile spikelets* 2–3, oblong, subapproximate; *fertile ones* 2–3, distant. *Fruit* hairy, with a bifid beak. *Glumes* glabrous, sometimes longer, sometimes shorter, than the fruit.


Hab. Bogs and marshes, rare. Ravelrig-toll Moss, in the watery spots, very plentiful. June. Ψ.

*Slender-leaved Carex.*—Root creeping. *Culms* erect, 1–3 feet high, slender, triquetrous, subglabrous. *Leaves* as long as the culm, erect, very narrow, terminating in a long setaceous summit. *Sterile spikelets* 2–3, approximate; *fertile ones* 1–3, brown, erect. *Glumes* very dark, with a green keel, which generally terminates in a scabrous mucronate point.

—A rare Carex, and found in the above station about the middle of the moss.

### III. TETRANDRIA.

7. *LITTORELLA.*

*(Nat. Ord. PLANTAGINEÆ, Hook. Scot. 2. p. 209.)*

1. *L. lacustris.*


Hab. Margin of lakes, and spots under water part of the year. Marsh on Dunearn Hill, Mr Neill. Pool on Guillon Links, Dr Graham. July, August. Ψ.

*Plantain Shoreweed.*—Glabrous. *Leaves* all radical, linear, semicylindrical and fleshy, 1–2 inches long. *Scapes* several, 1–2 inches long, bearing sterile or stameniferous flowers. *Calyx* 4-leaved. *Corolla* with the tube inflated, and a 4-partite limb. *Filaments* of the 4 stamens long, weak.
CERATOPHYLLUM. MONÓECIA. POLYANDRIA. 201

Fertile flowers sessile, in the axils of the leaves, the germen inclosed by a rather irregularly-3-cleft perianth. Style long, filiform.

8. ALNUS.


HAB. Moist-woods, stream-sides, and bogs, common. May. ¾.

Common Alder.—A tolerably large tree, with a brown rough bark, and red wood. Leaves alternate, petiolate, glabrous, deep green, glutinous as well as the young branches, beneath paler, and ribbed with prominent veins. Flowers in amens (catkins), on branched peduncles. Stameniferous amens cylindrical, pendulous, each floret with a calyx and corolla, the latter 4-cleft. Stamens 4, on very short filaments. Pistilliferous amens small, ovate, fine red, each floret with a simple perianth, the scales red.

9. URTICA.


HAB. Road-sides and waste places, very common. July—September. 0.

Small Nettle.—Stems 12–18 inches high. Leaves bright green, plentifully armed with offending bristles. Stipules minute, reflexed. Clusters of flowers scarcely longer than the petiols.


HAB. Waste places, very common. July, August. ¾.

Great Nettle.—Root creeping. Stems 3–4 feet high. Leaves petiolate, scabrous, armed with stingling bristles. Stipules ovate, erect. Sufficiently distinguished from the preceding by the much branched clusters of flowers.—The young shoots in spring are not unfrequently gathered by the country people to make nettle-kail.

IV. POLYANDRIA.

10. CERATOPHYLLUM.
(Nat. Ord.—Situation uncertain, Hook. Scot. 2. p. 297.)


HAB. In ponds and ditches. Canonmills Loch, 1809, abundant, Mr Neill. July. ¾.

Common Hornwort.—Whole plant under water. Stem slender, long, much branched. Leaves whorled, linear, dichotomous, the segments setaceous, serrate. Flowers axillary, sessile, minute, with sessile anthers.—Diffs from C. demersum solely in the armed fruit.
11. MYRIOPHYLLUM.
(Nat. Ord. HALORAGEE, Hook. Scot. 2. p. 258.)


Spiked Water Milfoil.—Plant immersed in the water except the spike. Stem slender, long, branched. Leaves 4, whorled, spreading, finely pectinate. Spikes erect, terminal, composed of 6–8 whorls of flowers, the lowermost pistilliferous. Stamens longer than the small red petals. Stigma villose.

12. ARUM.
(Nat. Ord. AROIDEÆ, Hook. Scot. 2. p. 199.)


HAB. Woods and hedges, rare about Edinburgh. Woods at Dalhousie, abundant; and at Bogsmill near Slateford, Maughlan. April. Բ.

Cuckow-pint or Wake-Robin.—Root tuberous. Plant glabrous. Leaves all radical, large, shining, sometimes spotted. Spadix large, 6–8 inches high, or more in shady places, pale green, very concave, the margins convolute, the summit acute. Spadix long, fine purple or deep carmine; at its base are the germens and sessile anthers. Fruit bright scarlet berries on a blunt spike, ripening after the leaves and spatha are passed away.—Plant excessively acid, but the roots afford a farinaceous nourishment when properly prepared, which is sold in some parts of England.

13. QUERCUS.
(Nat. Ord. CORYLACEÆ, Hook. Scot. 2. p. 195.)


HAB. Woods and hedge-rows, frequent. Բ.

Common British Oak.—A noble tree with spreading branches, a rough bark, and very hard wood. Leaves alternate, subsessile, glabrous, shining above, the number and form of the lobes varying. Flowers in axillary racemes, the stameniferous ones pendulous, yellow, many-flowered; the pistilliferous ones on long, about 3-flowered peduncles. Fruit the well-known acorn, which is contained in a beautiful receptacle, the acorn-cup of poetic celebrity, from which it is deciduous.—An extensively useful tree.


HAB. Woods. Rosslyn woods, Maughlan. Բ.

Sessile-fruited Oak.—A large tree, but much inferior in hardness of wood to
the preceding. Leaves on longer petiols than the preceding, and more regularly lobed; but it is quite sufficient to notice the fruit, whose receptacles are perfectly sessile.

14. CASTANEA.

Hab. Plantations. May. 2.

Spanish Chestnut-tree.—A beautiful tree, growing, if unmolested, to a prodigious size. Bark deeply cleft. Leaves glabrous, petiolate. Flowers in racemes; sterile ones on racemes, 5-7 inches long, pendulous; fertile ones on separate racemes. Fruit large, prickly; seeds mostly 2.—Fruit the well-known chestnuts of the dessert in this country, and used as regular food in the south of Europe.

15. FAGUS.


Beech-tree.—A large, handsome, spreading tree, with a smooth, entire bark. Leaves alternate, very numerous, shining. Sterile flowers in a small, axillary, pedunculate, villous head. Stamens 5-12. Fertile flowers terminal, shortly pedunculate. Fruit covered with a somewhat prickly brown, simple fringe.

16. BETULA.
(Nat. Ord. Salicaceae, Hook. Scot. 2. p. 201.)

Common Birch.—A moderate-sized tree, with a white bark, which peels off in thin layers. Branches very slender, and often drooping gracefully. Leaves small, scarcely an inch long, petiolate, subpubescent beneath, especially when young. Flowers in drooping aments (catkins); sterile ones the longest, cylindrical, yellow; fertile ones not an inch long, on short peduncles, green.

17. CARPINUS.


Hornbeam.—A small tree, with the habit (as Smith observes) of an Elm. Leaves alternate, petiolate, ovate, acute, doubly serrate, glabrous, ribbed with parallel veins. Sterile flowers in pendulous catkins, yellowish, with ovate scales; anthers 6-12. Fertile flowers in terminal clusters, at the base of the scale-like bracteas, the styles 2. Bracteas enlarging as the
fruit advances, in the form of a solitary ovate nut, enveloped by the angular perianth.

18. Corylus.


Hab. Woods and hedges, very common. March, April. *

Hazel-nut Tree.—A small tree. Young branches hairy. Leaves alternate, on short petiols, roughish, coming out after the flowers. Sterile flowers in drooping catkins 1-2 inches long, the stamens which accompany each scale about 8. Fertile flowers in small, sessile, scaly, bud-like involucres, the styles about 12, exserted at the apex, fine crimson. Fruit the well-known hazel-nut, deciduous from the involucre.

19. Pinus.

(Nat. Ord. Conifera, Hook. Scot. 2. p. 194.)


Hab. Forests, but about Edinburgh in plantations. May. *

Scotch Fir.—A magnificent tree in the Highlands, where it is truly wild, and differing as much from the formal ornament of the plantation, as the hardy mountaineer from the sedentary mechanic of a crowded city. Trunk reddish brown, the bark scaling off in thickish plates. Branches sent off at regular intervals. Leaves evergreen, but of a melancholy hue. Sterile flowers yellow, in a densely spiked catkin. Anthers sessile, with a profusion of pollen. Cones tessellated, tuberculate.—The only native species. Splinters of the wood used by the Highlanders in the place of candles, the younger individuals of a family holding them in turn.

XXII. Dioecia.

I. Diandria.

1. Salix *

(Nat. Ord. Salicinæ, Hook. Scot. 2. p. 196.)

* Leaves serrate, smoothish.

1. S. Lambertiana, monandrous, erect; leaves obovato-lanceolate, serrate, glabrous; stipules none; germens shortly

* As I have not such authentic specimens of many Salices as I could wish, the following characters and descriptions chiefly rest on the authority of Sir J. E. Smith and Professor Hooker.
Salix.  Digenia.  Diandria.  205


Boyton Willow.—A small tree about 10 feet high. Leaves alternate or somewhat opposite, broadly lanceolate, on very short petiols, serrate towards the apex, and glaucescent beneath. Catkins cylindrical, about ⅜ths of an inch long, the scales orbicular, blackish.—Dr Hooker thinks *S. purpurea,* Helix, and the present one, varieties of the same species.


Hab. Marshes and banks of streams. Near Craigerook, Maughan. April, May. 7.

Short-leaved triandrous Willow.—A large tree, if unmolested, but, from its usefulness, generally cut down annually. Bark of the trunk and branches scaling off; the young branches even. Leaves 2–3 inches long, closely serrate, "linear-oblong" (Sm.) perfectly glabrous on each side, bright green above, glaucescent beneath. Stipules ovate, oblique, crenate, at length rounded and deflexed. Catkins yellow, erect, cylindrical, the scales yellow, obovate, obtuse, villose. Stigmas spreading, cleft.


White Welch or Varnished Willow.—"A small tree of handsome growth, readily known by the very smooth, shining bark of its last-year's shoots, which is of a light reddish-brown, or clay-colour, appearing as if varnish-ed; the young twigs are often beautifully stained with crimson." (Sm.) Leaves lanceolate, acuminate, serrate; those of the small flowering branches obtuse, nearly obovate, and recurved, except the terminal one. Sterile catkins yellow, cylindrical, the scales oblong. Germin pedicellate, glabrous.


5. *S. fragilis,* leaves ovate-lanceolate, acute, serrate, glabrous; germens shortly pedicellate, ovate-oblong, glabrous, style elongate; scales pubescent, and much ciliate. *Lightf.*

Hab. Banks of streams and moist hedge-rows. About Edinburgh less frequent than the preceding. Ravelrig-toll, Maughan. April, May. 7.

Crack Willow.—A large tree with crooked branches. The small branches very brittle at their origin. Leaves petiolate, oblong-lanceolate, acuminate, glabrous on both sides, shining above. Stipules semi-cordate, toothed, sometimes wanting. Catkins long, cylindrical, erect, the sterile ones yellow; fertile ones greenish. Stamens 2–3. Gernern scarcely longer than the scale.


Pentandrous or Sweet Bay Willow.—A handsome, small tree, with smooth, shining branches, and broad, shining, dark green leaves. Leaves shortly petiolate, elliptical-lanceolate, or broadly ovate and acuminate, with yellow, sweet-scented glands at the margin, glabrous and shining on both sides, but paler beneath. Sterile catkins broad, yellow, lax. Scales as well as in the fertile ones pilose.—Varies with more than 5 stamens when cultivated.


Dark Broad-leaved Willow.—A small shrubby tree, the branches brittle, with a smooth blackish bark. Leaves about 3 inches long, stoutly petiolate, terminating at the petiol in rather a rounded manner, glaucous, and a good deal veined beneath. Stipules large, obliquely cordate, serrate, glabrous, sometimes wanting. Catkins scarcely an inch long, oblong, the scales obovate-lanceolate, brown.

**Leaves serrate or subentire, more or less hairy or silky.


Downy Mountain Willow.—"Plant 1–2 feet high, with a dark brown, glossy bark. Leaves downy or silky, slightly so above, but especially beneath, where they are almost white. Germen with a remarkably long, slender, dark coloured style. Scales almost black, very villous." Hook.—Sir J. E. Smith quotes S. Lapponum of Lightfoot under S. arenaria. Dr Hooker refers it with a question to S. glauca, which does not grow in this neighbourhood.
9. *S. repens*, "monadelphous; leaves elliptic-lanceolate, acute, entire, somewhat downy, glaucous, and generally very silky beneath; germens pedicellate, lanceolate, very silky, the styles short, with bifid stigmas; stems more or less procumbent." *Hook.* Fl. Scot. p. 284.


Dwarf Silky Willow.—Plant with a dwarf, mostly subprocumbent habit, seldom rising higher than 2 feet, frequently only a few inches. "The leaves in all are smooth above, with prominent nerves beneath; the catkins are oblong, and differ in no respect, be the leaves ever so variable." *Hook.* The leaves vary from lanceolate to ovate-elliptical, always more or less silky beneath.

Having been so frequently perplexed in finding characters between *S. repens*, *S. adscendens*, *S. parvifolia*, and *S. fusca*, of E. B., I have examined these plants and their varieties with more care than many other species, and cannot but concur with Dr Hooker in their reduction. That author has also brought *S. argentea* under his *S. repens*; it is the only one of which I am doubtful.


Grey Willow.—A small tree, 12-20 feet high, with smooth branches, the youngest ones pubescent. Leaves obovato-lanceolate or somewhat oblong, acute, glaucous beneath, reticulated, and hairy. The differences between the above quoted species, are, that *S. aquatica* has the leaves somewhat broader, less thick and downy, and more pliable, and the catkins not so large as in *S. cinerea*. *S. oleifolia* has the catkins larger than either, the leaves less inclined to lanceolate, and the stipules, which in the other two are semi-cordate, are here smaller and roundish; it is also a more early plant in flowering. These variations, which are collected from E. B. are surely not sufficient to designate species *.

* The following are Sir J. E. Smith's characters for the three species: *S. cinerea*, leaves slightly serrated, obovato-lanceolate, underneath reticulated with veins, glaucous, downy; stipules semi-cordate, serrate. *S. aquatica*, leaves slightly serrated, obovato-elliptical, downy, flat, rather glaucous beneath; stipules rounded, toothed. *S. oleifolia*,

**Hab.** Woods and thickets, mostly in a dry soil. Very common. April, May. 

**Great round-leaved Sallow.**—A small tree, if allowed to grow; the youngest branches pubescent. *Leaves* large, broadly ovate, waved at the margin, and whitish and very downy beneath, above subglabrous. *Stipules* semi-cordate or roundish, recurved, less tomentose beneath than the leaves. *Catkins* ovate, large; the *sterile* ones very yellow; the *fertile* ones green. *Scales* obovate, very pilose, shorter than the pedicellate fruit.


**Hab.** Moist woods and hedges. Banks of the Esk, near Musselburgh; and in Colinton woods by the river-side, Maughan. April, May. 

**Long-leaved Sallow.**—A small tree, with the habit of the preceding, according to Smith, but less. *Youngest* branches somewhat silky. *Leaves* 3 inches long, rather ovate-oblong, bright green and glabrous above, tomentose beneath. *Catkins* oblong-cylindrical, obtuse, the scales ovate, hairy. *Fruit* on a long pedicel, pubescent; style short, with an obtuse, undivided stigma.


**Hab.** Banks of streams and osier-grounds. Banks of the Esk, above Musselburgh, Maughan. April. 

**Silky-leaved Willow.**—Branches erect, wand-like, reddish, smooth, when very young, pubescent. *Leaves* shortly petiolate, lanceolate or ovato-lanceolate, acuminate; green and glabrous above, silky beneath, and soft to the touch, veiny. *Fertile catkins* ovate, small and sessile, the scales obovate, brown, very hairy. *Stigmas* linear, divided to the base. —Said to be a useless plant.

14. *S. viminalis*, leaves linear-lanceolate, obscurely crenate, white and silky beneath; stipules small, sublanceolate; branches straight, slender; germens subsessile, lanceolate-subulate, with an elongate style, and long linear entire stigmas. *Lightf.* p. 608.

*S. oleifolia*, leaves obovato-lanceolate, flat, minutely indented, acute, underneath glaucous and hairy; stipules small, notched.

It will be perceived, that the differential characters are very slight, depending on a little difference in the form of the leaves, (which often vary exceedingly in the same species), the degree of serrature at the margin, and a small difference in those variable organs, the stipules.
Empetrum. Diccia. TRIANDRIA.


Hab. Marshes and osier-grounds, frequent. Rosslyn, &c. April, May. [i].

Common Osier.—Branches very long, wand-like, silky. Leaves 6–9 inches long, sublinear; almost entire, revolute at the margin, glabrous above, silky beneath. Stipules lanceolate, or wanting. Fertile catkins oblong-cylindrical, about an inch long; scales ovate, rounded, very pilose. Germs with an elongated style; stigmas slender, acute, entire.—The most useful osier. A large tree when allowed to grow.


Hab. Moist coppices and osier-grounds, frequent. Rosslyn woods. May. [i].

Common white Willow.—A large tree of rapid growth. Youngest branches silky. Leaves shortly petiolate, very grey and silvery, the lower serratures glandular. Stipules wanting. Catkins terminal, on small lateral shoots, slender, cylindrical, yellowish green, an inch long or more. Scales lanceolate, pubescent. Stamens a little longer than the scales. Germ glabrous.—There can be no question that Dr Hooker is right in identifying S. caerulea with this species. The only difference given in Smith's character is, the leaves being at length almost naked beneath.

II. TRIANDRIA.

2. EMPETRUM.

(Nat. Ord. Empetræ, Nutt.—Situation uncertain, Hook. Scot. 2. p. 297.)


Hab. Mountains, frequent. Pentland Hills. May. [i].

Black Crake-berry.—A low, little, trailing, somewhat shrubby plant, with abundance of small shining leaves. Stems and branches procumbent, reddish, 8–16 inches long. Leaves patent, glabrous, revolute, ciliate only at the margin. Flowers minute, axillary, sessile, rose-coloured, towards the summit of the branches. Anthers red. Fruit small berries, black, globular, in dense clusters. Seeds 9.—Berries not poisonous, but not agreeable.

III. PENTANDRIA.

3. HUMULUS.


1. H. Lupulus.

HAB. Hedges. Near Duddingston, Mr Arnott. July. 

Common Hop.—Stems climbing, annual, very long, angular, and very scabrous. Leaves cordate, opposite, petiolate, mostly 5-lobed, serrate, scabrous. Stipules entire, glabrous. Flowers greenish yellow; the fertile ones ovate, pendulous, cone-like catkins, at length scariose.—Catkins yield the bitter, requisite for the legal composition of beer.

IV. OCTANDRIA.

4. POPULUS.

(Nat. Ord. Salicin.e, Hook. Scot. 2. p. 200.)


HAB. Plantations, occasionally about Edinburgh. April. 7.

Great White Poplar or Abele.—A large tree, with a smooth bark, and horizontal roots, which throw up numerous young plants. Young branches tomentose. Leaves on longish downy petiols, dark green, glabrous, shining above. Sterile catkins long, cylindrical, the scales jagged in a palmate manner, very pilose. Anthers purple. Fertile catkins about an inch long.


HAB. Woods and hedges, frequent. Rosslyn woods. April. 7.

Aspen.—A rather large tree, though sometimes dwarfish, the bark smooth, greyish. Roots running horizontally, and throwing up numerous young plants. Leaves on long petiols, and trembling with the slightest wind. Fertile catkins near 2 inches long; scales much jagged. Germen roundish; stigmas 4.—From this tree is taken the proverb; “to tremble like an Aspen.”


HAB. Woods and plantations, frequent. Rosslyn woods. April. 7.

Black Poplar.—A tall tree with a smooth bark; roots not throwing up young plants, like the two preceding species. Leaves glabrous on both sides, dark green, entire at the base, or less serrate than towards the apex. Catkins pendulous, shortly pedunculate. Germen ovate.

V. ENNEANDRIA.

5. MERCURIALIS.

(Nat. Ord. Euphorbiaceae, Hook. Scot. 2. p. 203.)

VI. MONADELPHIA.

7. JUNIPERUS.


XXIII. POLYGAMIA.

I. MONOCÉIA.

1. ATRIPLEX.

1. A. portulacoides, stem shrubby; leaves ovate-lanceolate,


Shrubby Orache or Sea Purslane.—Root somewhat creeping. Stem shrubby, 1-2 feet high, quadrangular above, hoary. Leaves opposite, petiolate, varying from lanceolate to obovate-lanceolate, attenuated at the base, silvery white. Flowers yellowish, small, in clusters on lateral short racemes, forming altogether a sort of spiked leafy panicle.


Frosted Sea-Orache.—Plant hoary and silvery. Stems spreading, often quite procumbent, branched in a flexuose manner, whitish or reddish. Leaves alternate, shortly petiolate, somewhat attenuate towards the petiole, unequally dentato-laciniate, beautifully frosted. Flowers axillary, 2-3 together. Perianth of the fruit much enlarged, denticulate or tuberculate, enclosing a compressed seed.


Spreading Halbert-leaved Orache.—Stem suberect, much branched in a spreading, divaricate manner, sometimes prostrate, often reddish. Branches striate, very long, especially the lowest. Leaves alternate, frosted beneath, more or less deeply toothed at the margin, very acute. Flowers in small clusters, on long, filiform, interrupted, spiked racemes. Perianth-valves of the fruit triangular, acute, toothed towards the base, and tuberculate on the sides. Seeds large, dotted.


Spreading narrow-leaved Orache.—Stems even more divaricate than those of the preceding, 3-4 feet long, of a deep glaucous hue, striated. Lower leaves hastate, but not toothed nor sinuate; upper ones lanceolate, and likewise quite entire; all spreading horizontally. Valves of the fruit-bearing perianth hastate, or triangular, with an elongate, acute summit, entire at the edge, their disk either quite smooth or scattered with only a few tubercles. Seed but half the size of A. patula.—Character and description from Smith. It is doubtfully distinct from the last, and not constant to its characters.

5. A. littoralis, stem herbaceous, erect; leaves all linear, en-
Equisetum. Cryptogamia. Equisetaceæ. 213

Grass-leaved Sea-Orache.—Stem erect, 1–2 feet high, angular and strinate, branched. Leaves linear, petiolate, chiefly glauco-pulverulent beneath, varying considerably in the margin being entire, denticulate, or even sometimes sinuate. Flowers clustered in small, dense, lateral and terminal spikes.

XXIV. Cryptogamia *.


1. Equisetum †.

* Fertile stems simple.


Hab. Moist corn-fields, frequent. Marionville; Coltbridge field, Mr Neill. April, May.  

Corn Horsetail.—Root creeping. Fertile stems appearing first, 6–8 inches high, with 3–5 sheaths, the spike ovate, rather large, brown. Sheaths rather remote, furrowed, the teeth brown, long, acute. Sterile stems a foot high or more, jointed, furrowed, scabrous. Branches simple, in whorls. —An injurious weed, very difficult to eradicate.


* In this most extensive and most difficult Linnean Class, so many plants have been discovered of late years, which it is impossible to include with any precision, under the Linnean orders and definitions, that I shall adopt the most approved orders, as they exist in the natural system of Jussieu and others; which will render the study of the intricate genera they contain, incomparably more easy. Nor, while we retain the name of the class, will this plan interfere with the Linnean method, the whole class being truly natural.

† The Class Cryptogamia in Dr Hooker's Flora Scotica forms the commencement of the second part, which contains a natural arrangement of Scottish plants. It is unnecessary, therefore, to continue the references to the Natural Orders in that work, as the synonyme will be sufficient; except when I may happen to differ from the author.
Great Water Horsetail.—Fertile stems appearing first, a foot high, very robust, terminated by an oblong spike, 2 inches long or more; sheaths numerous, imbricated below. Sterile stems 2-5 feet high, sometimes near an inch in diameter at the base, with a great number of joints, and a profusion of long, simple, verticillate branches.


Hab. Marshy woods. Rosslyn and Colinton woods, Maughan. Dalkeith, and between Lasswade and Mavis Bank, Sir J. E. Smith. July, August. 2. Rough Horsetail.—Root creeping. Stems divided at the very base beneath the surface of the ground, 1-2 feet high, perfectly simple, terminating in a small oval head, scarcely more than half an inch long; furrowed, the ribs close and very scabrous, which is most evident when rubbed with a hard substance. Sheaths nearly equidistant, about an inch and a half asunder.—This species contains more silex beneath its delicate epidermis than any other, and is consequently most employed in polishing hard wood, ivory, and even brass. The silex is so abundant, that the vegetable matter may be destroyed, and the form retained, as was effected by Mr Sivright. **

** Fertile stems more or less branched.


Smooth naked Horsetail.—Stems 1-2 feet high, erect, furrowed, perfectly glabrous, with numerous, short, cylindrical sheaths, with short, blackish, acute teeth. Branches are not unfrequently wanting altogether, and when they are present, they are usually short, unequal in length, and

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* My friend Dr Brewster has obligingly permitted me to consult an unpublished paper, written by him on this subject. On subjecting a portion of the cuticle to the analysis of polarized light under a high magnifying power, Dr Brewster detected a beautiful arrangement of the siliceous particles, which are distributed in two lines parallel to the axis of the stem, and extending over the whole surface. The greater number of the particles form simple straight lines, but the rest are “grouped into oval forms, connected together like the jewels of a necklace, by a chain of particles forming a sort of curvilinear quadrangle; these rows of oval combinations being arranged in pairs.” Many of those particles which form the straight lines do not exceed the 500th part of an inch in diameter. Dr Brewster also observed the remarkable fact, that each particle has a regular axis of double refraction. In the straw and chaff of wheat, barley, oats, and rye, he noticed analogous phenomena, but the particles were arranged in a different manner, and “displayed figures of singular beauty.” From these data, the learned Doctor concludes, “that the crystalline portions of silex, and other earths which are found in vegetable films, are not foreign substances of accidental occurrence, but are integral parts of the plant itself, and probably perform some important function in the processes of vegetable life.” Brewster, MS.
Pilularia. Cryptogamia. Marsiliaceae. 215

mostly in imperfect whorls. Spike brown, ovate or oblong, seldom an inch long.


Hab. Ditches and marshes, frequent. Duddingston Loch, Mr Bainbridge. June, July. ʃ.

Marsh Horsetail.—Root creeping. Stems 12-18 inches high, erect, branched, deeply sulcate, roughish. Branches " minutely granulated in the surface, but scarcely rough to the touch," (Sm.) short, whorled, suberect. Spike near an inch long, rather slender, blackish, the scales at length becoming lax and distant.


Hab. Woods and moist shady places. Braid Hermitage, Dr Parsons. Rosslyn woods, frequent, Mr Neill. Road-side half a mile east of Ravelrig-toll; and Pentland Hills by the lower reservoir. April and May. ʃ.

Branched wood Horsetail.—Stems 12-18 inches high, and so well marked by its 4 or 5 whorls of compound branches, that it can be confounded with no other species.—A most elegant plant.

II. Marsiliaceae. Br.

2. Pilularia.


Pill-wort or Pepper-grass.—Stems creeping, tufted, striking roots and throwing up leaves at intervals from the same points. Leaves filiform, grass-like, at first convolute, at length straight, erect, 3-4 inches high. Involucres shortly pedunculate, solitary at the base of the leaves, about the size of a small pea, squamoso-hirsute, dark brown, 4-celled. Cells in their upper part containing pyriform bodies, which are regarded as anthers enclosing pollen; and in their lower part, oval membranaceous gernnens tipped with a minute stigma, containing numerous sporules intermixed with minute globules.—This most curious plant requires a practised eye to discover it, as it generally grows in marshy places, part of the year under water, and along with grasses and carices, some of whose leaves resemble its own. For farther information respecting its structure, the reader is referred to the best figure and description hitherto published, in the Flora Londinensis, by Dr Hooker.

III. Lycopodineae. Br.

3. Lycopodium.

1. L. clavatum, stem creeping, the branches ascending;
leaves scattered, incurved, hair-pointed; spikes geminate, cylindrical, pendunculate, their scales piliferous. *Lightf.* p. 685. 


**Hab.** Alpine moors and heaths. Pentland Hills by the old reservoir, and in other places. July, August. 4.

**Common Club-moss**—Stems robust, yellowish-green, 1-4 feet in length, creeping closely on the ground, and throwing up flowering branches 3-6 inches in height. *Leaves* very numerous, imbricating the stem and often secund. *Spikes* of fructification yellowish, mostly geminate, rarely 3 together, about an inch in length. *Scales* piliferous, as are also those of the peduncle.—Sporules highly inflammable.


**Hab.** Mountains. Pentland Hills, Sir J. E. Smith, (not frequent.) July, August. 4.

**Alpine Club-moss**—Stems branched, creeping to a considerable extent, and throwing up abundant fasciculated, dichotomous branches, about 2 inches high, more or less closely imbricated with small, appressed, glaucous leaves, quite destitute of a hair point. *Spike* half an inch long or rather more, oblong-cylindrical; the *scales* cordate-acuminate, beardless.


**Hab.** Moist places on the mountains. Pentland Hills, Mr Neill, (not frequent.) August. 4.

**Prickly Club-moss**—Stems slender at the base, creeping, the branches ascending, bright green, fertile ones 2-4 inches high, suberect, lax, yellowish-green, loosely clothed with lanceolate, spreading, shining leaves, larger than those of the sterile stems, all ciliate at the margin, with acute prickly teeth. *Spike* terminal, occupying about an inch of the fertile stems.


**Hab.** Rocky moist places on the mountains. Pentland Hills on the rocks above Swanston Wood. June—August. 4.

**Fir Club-moss**—Stem 3-8 inches high, very robust and rigid, the branches of the same thickness from the base to the summit, where they are equal in height. *Leaves* all similar, very rigid, erecto-patent, shining. *Capsules* axillary and sessile, and often scattered over two-thirds of the length of the branches.
IV. FILICES. 

Div. I. Capsules 1-celled, adnate at the base, opaque, without a ring, semi-bivalved. Ophioglossae.—(Fructification pedunculate; stem in the British species with a single lateral frond.)

4. OPHIOGLOSSUM.


Hab. Moist shady pastures. Carlowrie, Mr Falconer. Balmuto, Miss Boswell. May, June. ?

Adder’s Tongue.—Root simply fibrous. Whole plant glabrous, succulent, 5–9 inches high, the stem bearing a single, entire, sessile frond, and then prolonged into a slender peduncle, supporting a linear-lanceolate spike about an inch in length. Capsules numerous, arranged along and within the margin, on each side, united together and bursting transversely when mature.—The spike is sometimes, but rarely, found branched.

5. BOTRYCHIUM.


Hab. Dry pastures. Craiglockhart Hill, Mr Neill. Hills above Pettycur; Pentland Hills, Maughan. Caroline Park, Mr Arnott. (In the latter station it is in tolerable abundance near the signal-post at the N.W. corner.) June. ?

Moonwort.—Root simply fibrous. Whole plant 3–8 inches high, glabrous. Frond produced above the middle, 1–3 inches long, the pinnules alternate, plane, with an odd one. Spike pedunculate, more or less branched in a distichous manner, the branches patent. Capsules numerous, sessile, at the margin and extremity of the branches, yellowish, bursting transversely, and filled with a mass of minute seeds.—Dr Hooker, in his Flora Scotica, mentions, that Captain Carmichael has found specimens in which capsules were produced round the lower segments of the fronds. This is a curious fact, and brings the leaves of this and the preceding genus nearer to the nature of true fronds than had been supposed.

Div. II. Capsules 1-celled, furnished with an elastic jointed ring, and opening transversely. Gyrate, Br.

6. BLECHNUM.

7. **PTERIS.**


Hab. Stony places on the mountains. Salisbury Craigs, Mr J. Stewart. (I fear there is some mistake connected with this station.) July. 2.

**Curled Stone Fern.**—Fronds light green, 6-12 inches high, on long slender footstalks, glabrous, the general form somewhat deltoid. The pinnules of the fertile frond have a very convolute appearance beneath, the waved margin being much rolled over the capsules, which at first sight appear, when mature, to cover the whole surface.


**Common Brakes.** *Brachens.*—Root long and fusiform. Plant 2-6 feet high, the stalk bluntly angular, stout, erect, glabrous. Frond very large, spreading, compound. *Lines of fructification* protected by the convolute and ciliated margin of the segments.—Thomas Smith, Esq. of the Temple, London, has observed an involucre besides the one formed by the convolute margin of the frond, to which it is opposite, and curling inwards, covers the young capsules; the whole being protected by the outer one, or margin of the frond. (*Vid. Hook. Fl. Scot.* p. 157. *Note.*) The ferruginous filaments which are produced by the root of this plant, have been described by Agardh and other authors, as a *conferva.* Several other ferns possess similar ones, which, as Captain Carmichael (who ascertained the error) observes, have no superior claim to distinction.

8. **SCOLOPENDRIUM.**

1. **S. vulgare.**


**Common Hart's-tongue.**—Fronds suberect, on rather short stalks, 8-16 inches long, ligulate, entire, acute, corinate at the base, glabrous, fine green, paler beneath. *Lines of fructification* linear-oblong, oblique, in the direction from the mid-rib to the margin of different lengths. *Involucre* double, but appearing single when burst, and crowded with the mature capsules.
9. ASPLENIUM.


_Forked Spleenwort._—Plant growing from the crevices of rocks in dense tufts 2-4 inches in length. Fronds rigid, glabrous, dark green, slender. *Lines of fructification* approximate, at first distinct, but the involucres, after bursting, become at length obliterated, and the capsules appear to cover the whole inferior surface of the frond.


_Sea Spleenwort._—Fronds 3-12 inches long, lanceolate, the stipes generally dark purple, glabrous, shining. Pinnae patent, the serratures rounded. *Lines of fructification* linear-oblong, oblique, distinct, on both sides of the midrib.


_Hab._ Crevices of rocks and walls, frequent. Rocks in the King's Park, abundant, Mr Yalden. June—October. "

_Common Maidenhair Spleenwort._—Plant growing in tufts 3-10 inches long, dense at the base with a mass of old stalks and roots. Stipes slender, wiry, blackish purple, shining, smooth. Frond dark green, closely pinate. Some of the lowermost pinnae remote, and of a rounder form than the others. *Lines of fructification* 6-8, minute, oblong, oblique, distinct.


_Hab._ Walls and crevices of rocks, frequent. King's Park, plentiful, Mr Yalden. June—October. "

_Rue Maidenhair._—Plant tufted, 2-6 inches long, the stalks issuing from a dense mass of roots, green and slender. Fronds spreading, rather rigid, dark glaucous green, the lower divisions bearing 3-5 pinnules. *Lines of fructification* linear, of different lengths, very slightly oblique, approximate in the middle of the pinnules, at length appearing one mass of capsules.

5. A. Adiantum nigrum, fronds bipinnate, pinnae oblong-lan-
Involucres Smith, Polypodium the pinnules Lightf. sori the lowermost at A. Pinnules fragilis p. segments ceolate, E. 220 winged. ciso-serrate p. acute ceolate, brittle Black. Brit. Lanceolate, rather long, involucre its rachis; brous, much in its length. Habit. pinnules green, the segments subentire; rachis divided, so much so indeed, that no single character would apply. General and partial rachis narrowly winged. Sori (spots of fructification) numerous, pale. Involucre somewhat cyathiform, at length lacerate and reflexed. —I can find no difference between A. regium and fragile, and have specimens exactly intermediate.


Female Shield-fern.—Fronds growing in elegant tufts, and are a foot and a half or two feet high; the general outline is oblong-lanceolate, acuminate at the apex. Stipes slender, glabrous. Pinnae alternate, linear-lanceolate, acuminate. Pinnules either opposite or alternate, cut, or sometimes even pinnatifid. Sori small, arranged on each side the rib of the pinnules and opening towards it.

** Involucres umbilicate, reniform.

† Pinnules with their apex and segments mucronate.

3. A. dilitatum, fronds bipinmate, pinnules oblong, distinct,

**Hab.** Woods and moist rocky places, frequent. June, July. **4.**

*Great crested Shield-fern.*—Fronds somewhat tufted, 1–3 feet high, varying exceedingly in appearance, according to situation and other causes. *Stipes* long, chaffy, slender, erect. *General outline* of the frond, sometimes triangular, at others ovate-acuminate, often oblong and suddenly acuminate. Some specimens are scarcely bipinnate, while others are almost tripinnate; the serratures, however, are constantly spinulose, and no others possessing the same character can now be confounded with it. *Sori* rather large, numerous, reddish.—I have specimens of this species from Ravelrig-toll with all the pinnae horizontal, and the lower ones so long as to render the form of the frond triangular.


**Hab.** Rocky shady woods. Rosslyn woods, Maughan. Arniston woods. June. **4.**

*Close-leaved prickly Shield-fern.*—Fronds rigid, lanceolate, acute, 1–2 feet high, alternately pinnate; *pinnae* lanceolate, acute, almost horizontal, pinulate or subpinulate. "It varies in size, but often equals *A. aculeatum* in the height of its fronds, though their breadth is always less in proportion. The whole frond is more firm and rigid, of a paler and more shining green. The *pinnae* are rather elliptical than ovate, crowded, less cut and lobed, but more remarkable for the great size of the foremost or uppermost one at the base of each subdivision of the frond, which often extends its point beyond the stalk above it."—*Smith.*


**Hab.** Shady rocky places. Rosslyn woods, Mr Neill. June. **4.**

*Common prickly Shield-fern.*—Plant growing in tufts. "Fronds numerous, large, and handsome, of a dark and blueish-green, paler beneath, lanceolate, acute, elegantly and closely bipinnate; their general and partial stalks remarkably scaly. *Pinnae* mostly alternate, ovate, a little curved into a crescent-shape, sharply serrate, each tooth tipped with a spine; all the pinnae are more or less lobed or dilated at their upper edge near the base, and sometimes the lowermost are pinnatifid," *Smith.*—Rather from a disinclination to differ from such authorities as Smith, Brown and Hooker, than from my own conviction, have I described the above two plants as distinct. I confess I cannot trace a correct line between them.

†† *Pinnae obtuse, destitute of mucronate points.*

6. *A. Filix mas,* fronds bipinnate, pinnae oblong, obtuse, serrate, the serratures not spinulose; sori approximate to the midrib; stipes and rachis chaffy. *Hook.* Fl. Scot. 2. p. 154.

Hab. Shady woods and banks, very frequent. King's Park, Mr Yalden. June. July. ¶.

Male Shield-fern.—Fronds broad, tufted, erect, 1-3 feet high, the stipes and general and partial rachis chaffy. Pinnae alternate, linear-lanceolate, acuminate, pinnulate; pinnales spreading, oblong, close, serrate, the serratures fine at the rounded apex. Sori large, reddish-brown, in two rows, one on each side the nerve.


Heath Shield-fern.—Fronds two feet high or more, tufted, regularly pinnate, the stipes and rachis chaffy; pinnae alternate, lanceolate, acuminate, pinnatifid. Sori arranged along the margins of the entire segments, which, with the glandulose under-surface, sufficiently distinguish the plant.

11. POLYPODIUM.


Hab. Old walls, buildings, mossy trunks of old trees, &c. common. Very fine at Braid Hermitage. May—October. ¶.

Common Polypody.—Root creeping, clothed with soft brown chaffy scales. Fronds 6-16 inches long, on a chaffy stipes, deeply pinnatifid; segments linear-lanceolate or linear-oblong, spreading, entire or somewhat serrate or crenate, glabrous. Sori arranged in two rows, one on each side the middle nerve, large, brownish-yellow, destitute of involucre.


Pale mountain Polypody.—Root creeping. Fronds about 1 foot high, including the long, slender, chaffy stalks; pale delicate green. Pinnae longest in the middle of the frond, becoming gradually less upwards, till the frond terminates in a slender point; the lowermost pair deflexed, which is sufficient to distinguish the species.

HAB. Shady stony places. Birch thicket near Logan House, Pentland Hills, Mr Neil. Arniston; Rosslyn; and Auchindenny woods. Hab- bie's How, Maughan. July. 4.

Three-branched Polypody.—Fronds on a long, slender, glabrous, erect stipes, the whole about a foot high or less; the frond itself divided into 3 main branches, each of which is pinnate; pinnae sessile, lanceolate, rather re- mote, pinnatifid. Sori submarginal, small.

V. MUSCI *.

12. ANDRÆA.

(All the species are alpine, growing on rocks, of a dark chocolate-brown or blackish colour, and more or less rigid in substance.)


HAB. Rocks and stones on the mountains. Pentland Hills, Maughan.

Stems growing in small dense tufts, of a lurid greenish-brown colour, and rarely more than half an inch high. Leaves imbricated, the uppermost ones only, falcate. Theca terminal, on the receptacle, which is elongated into the form of a short seta.


HAB. Mountain rocks. Pentland Hills, above Swanston Wood.

Plant much resembling the preceding. Stems forming small, dense tufts, half an inch to one inch high, of a blackish colour. Leaves all falcato-secund, much narrower than the last, and furnished with a nerve, which is the best distinction. Theca reddish brown, supported as in the whole genus, upon an elongated receptacle.

The calyptra in this genus is exceedingly fugacious, of a whithish colour, very thin and delicate. The 4-valved theca is closed in moist weather, but when exposed to warmth, it becomes depressed, and the sides being curved outwards, (still connected at the apex), the columella is exhibited within, through the interstices.

13. SPHAGNUM.

(All the species are of a pale whitish colour, vasculose structure, and grow in bogs or even in water.)


* In this Order the specific characters are mostly taken from Hooker and Taylor's Muscologia Britannica, and in a great measure the general arrangement.
Hab. Bogs; and some varieties in the water, as in old peat-pits, very common. Many curious states of it are to be found at Ravelrig-toll Moss.

Plants extremely variable, 2 inches to 2 feet long or more, much or very slightly branched, densely imbricated with leaves, or having them scattered or even remote; the branches are always (when present) most crowded towards the apex, and have usually a remarkable turgid appearance. Leaves ovate and obtuse, whitish, and of a loosely reticulated structure, as in the whole genus. Theca several, large, round, reddish brown, sessile on the receptacle, which is elongated on a white, thickish pedicel, very different from a true seta.—The form of the leaves is the best specific mark in this genus.


Hab. Bogs. Marsh above North Queensferry, and among the willows at Ravelrig-toll Moss, in fructification at both places.

Stems 3–12 inches long, branched, forming wide tufts of a pleasant whitish green colour. Branches often deflexed, crowded, and rather long towards the summit, straggling below, tapering at the extremities. Leaves ovate, rather suddenly acuminate, and bent back at the apex, which gives the squarrose character to the plant. Theca larger than in the last, but of the same form and colour.—This species is not by any means so prone to vary in its habit as the others. There is also a peculiarity in the structure of the reticulation of the leaves, which is constant, and wanting in the others.


Hab. Bogs, extremely common.

Stems forming dense wide tufts, frequently tinged with pink, 3–16 inches long, slender, not much branched. Branches slender, deflexed. Leaves crowded, imbricated, acute, varying somewhat in their degree of acuminature; when growing in water, approaching to the following. Theca several, smaller than either of the preceding, round or subovate.—When growing in water, the branches are sometimes falcate and remote, and the leaves longer. This state I have observed in peat-pits at Ravelrig-toll; where I have noticed a similar one of S. obtusifolium.


Hab. Bogs, growing generally in the water. Peat-pits at Ravelrig-toll, 4 feet long.

Stems slightly branched, very slender, 6 inches to above 4 feet long, growing in a lax manner, either at the margin or quite in the water, generally producing fruit where the water has partly dried up. Leaves very long and acute, in some specimens a quarter of an inch long. Theca 1–3, mostly situated some inches below the summit of the stem.—This species also occurs sometimes with falcate branches. The only way to preserve it, is to float it upon the paper.

Hab. Moist banks, rare. Braid Hill marshes, G. Don. In a stubble-field near Pentland, Mr E. Maughan.

*Plant* most minute, scarcely indeed visible to the naked unpractised eye, furnished with curious, creeping, leafless, articulated, spreading shoots at the base, which resemble a conferva so much as to have deceived several eminent botanists. *Perichaetial leaves* erect, serrate, reticulate. *Theca* small, ovate, acute, subsessile, containing about 100 seeds.—The most minute British moss.


Hab. Moist banks, rare. Caroline Park, Mr Arnott.

*Plant* growing in dense tufts, but minute, the stems not being a quarter of an inch high; branched, very leafy. *Leaves* spreading when moist, but remarkably crisped when dry, which distinguishes it from every other British species. *Theca* ovate, minute; sometimes there are several, clustered at the apex among the leaves.


Hab. Dry banks about Edinburgh, not unfrequent.

*Plant* spreading in small patches on the sides of dry ditches and banks, of a light green colour, and rigid erect appearance, about one-fifth of an inch high. *Leaves* suberect, setaceous, entire. *Theca* terminal, not becoming lateral like the following, subsessile, roundish-ovate, obtuse.


*Plant* growing in a lax manner on the ground, pale green, one-sixth to one-half of an inch in height, simple. *Leaves* entire, not so long as the preceding, nor so rigid, and the nerve is less strong; they also become more lax as the stem elongates. *Theca* at first terminal, at length lateral from the stem shooting past it, on a very short seta.—Dr Hooker decided the synonyme of *Ph. strictum* of Dickson, from Dickson’s own specimens, which I mention, as the figure in English Botany so little resembles it.

*Leaves more or less ovate.*

† *Seta* immersed among the leaves.

5. *P. cuspidatum*, leaves erect, ovate-acuminate, the nerve


Plant of a pleasant green colour, growing in tufts often widely spreading, 
1/4th or 1/3 of an inch high, simple or branched. Leaves erect, ovate- acuminate, or ovate-lanceolate, concave, the nerve reaching to, or more frequently beyond the point, and then forming a more or less rigid coloured apiculus. Theca rather large, compared with the other Phasca, roundish oval, yellowish brown, sunk among the leaves, but shining through them.


Hab. Dry banks. King’s Park, on the left hand side of the road to Duddingston, below Sampson’s Ribs, abundant.

Plant much smaller than the preceding, in wide tufts, densely crowded, and more or less hoary from the white hair-points of the leaves. Leaves erect, not so long as the preceding, and of a very different form, terminating rather suddenly in an acute apex, and the nerve prolonged into a long, weak, whitish hair; the reticulation is also more delicate. Theca rounder than the last, and not so much concealed by the leaves, which are scarcely large enough to envelope it.

†† Seta exserted.


Hab. Moist banks, rare. King’s Park.

A minute species, scarcely more than one-eighth of an inch in height, simple, not tufted, but growing separately, or a few together. Leaves few, subereet. Seta nearly twice as long as the leaves, subereet. Theca roundish, fine reddish brown, the apex conical.

15. GYMNOSTOMUM.

(Most of the British species of this genus grow on rocks or on the ground. They vary much in habit, and some can only be ascertained by an inspection of the mouth of the capsule; this in a few species is furnished with an imperfect horizontal membrane.)

* Stems elongated, branched.


Hab. Moist mountain rocks. Habbie’s How, Mr Arnott.

Plant growing in large, dense, even tufts. Stems half an inch to two inches long, branched, leafy from the very base. Leaves linear-subulate, imbricated, but spreading, and somewhat recurved, rather rigid, always cris-
ped when dry, at the summit of the branches; and in short specimens growing in more lax tufts, all of them often assume that character, but it is by no means constant. *Seta* about a quarter of an inch long. *Theca* ovate, small, sometimes subtruncate, polished. *Lid* obliquely rostrate, but not curved or rather bent, as in *G. curvirostrum.*—Some states of this moss are difficult to distinguish from *G. curvirostrum,* and it is easier to do so by the habit than by any peculiar character. In the moss last named, the leaves are more erect, and though somewhat curled when dry, are more rigid, and do not curl so much as in *G. rupestre.* The *seta* is also somewhat longer, the *theca* rounder, and the *lid* with a rather sudden curve, which is very characteristic *).

2. *G. curvirostrum,* leaves lanceolate-subulate, erect, not crisped when dry; *theca* ovate, dark and shining when old, the *lid* obliquely rostrate, often curled, as long as the *theca*. *Hedw.* Stirp. v. 2. t. 24. *Musc. Brit.* t. 6. *Smith, E. B.* t. 2241.

_Hab._ Moist rocks. Ecclesmahon Burn, Mr Arnott.

*Stems* tufted, 1–2 inches long, branched. *Leaves* pale green, spreading sometimes at the lower part of the stems, but erect upwards (when dry), and somewhat flexuose, but not crisped. *Seta* longer than in the preceding, but scarcely half an inch. *Theca* ovate, erect, "when old, of a dark shining chestnut. *Lid* the length of the *theca,* subulate, obliquely curved," (*Smith,*).—In addition to what I have observed under the last species, I may add, that the relative length of the operculum is a character by no means constant. The colour of the *theca* (a circumstance which has not escaped *Sir J. E. Smith,* however trifling it may seem, I find constant in the many specimens I possess; not indeed in shade, but the one is pale and the other dark, and of a much brighter nature.


_Hab._ Trees and rocks, rare in the north of Great Britain. Rocks on Inchkeith, D. Don.

*Plant* tufted, fine green, the stems branched, half an inch to one inch in length. *Leaves* numerous, imbricated, spreading, entire, acute, with a strong nerve. *Seta* very slender, a quarter of an inch long or more. *Theca* sufficiently distinguished by being furrowed, and furnished with an obliquely rostrate *lid.*—Since the *Fl. Scotiae* of Dr Hooker was published,

* Since the above was written, I have received the following characters from Dr Hooker.

*G. rupestre,* "*follis linearis-subulatis,* patentibus, flexuosis, siccate tortilibus, *capsula ovata,* *operculo conico-rostrata capsula breviore.*"

*G. curvirostrum* "*follis lanceolato-subulatis,* erectis, rigidis, siccate strictis, *capsula ovata,* *operculo oblique rostrata capsula longiore.*" *Hedw.* Stirp. 2. t. 24.

Respecting *G. rupestre,* Dr Hooker adds, "It is of a much deeper green colour than *G. curvirostrum,* the leaves are much longer, linear, flaccid, flexuose or twisted, both in a dry and moist state; the nerve is thick, the capsule is narrower, of a pale brown, the operculum less suddenly rostrate, and less oblique."

I am happy in being able to add the above observations, which have been drawn, like my own, from actual examination, and the difference between our accounts will contribute to show the variable nature of the plant.

p 2
Captain Carmichael has also discovered this moss on rocks near Appin. In England it is confined to trees.

** Stems short, simple.


Hab. Banks and wall-tops. About Edinburgh, G. Don. On the wall-tops by the side of the road to Corstorphine; to Colinton; and on the south Glasgow road, very abundantly.

This plant, which is scarcely half an inch high, including the seta, often covers the mud-topped walls with its reddish fruit. The leaves are easily distinguished by their piliferous extremity, and under the microscope, by the granules on the membranaceous expansion of the nerve. Theca varying in form from ovate to oblong, the latter being the variety p. gracile of the Muscologia Britannica, and occasionally found about Edinburgh.


p. ramosum, stem branched, all the branches producing fruit.

Hab. Banks and stubble-fields, very common. p. in moist places, and frequently in conservatories.

Plant one quarter to three quarters of an inch high, including the seta. Stem mostly quite simple, short. Leaves obovate, spreading, fine green, entire, the nerve reaching beyond the point, but not hair-like. Seta mostly longer than the stem. Theca small, turbinate. G. intermedium of Mr Turner, differs only in the seta, being a little longer, and the fruit more ovate. p. differs from the common form, in being often much branched and elongated.—I have specimens gathered near Edinburgh, 3ths of an inch high, with from 6-12 thecae, each terminating a separate branch.


Hab. Moist banks near the sea, rare. Leith Links, Mr Arnott.

Plants growing in small patches, chiefly conspicuous from the long reddish setæ and fruit, which often render it near an inch high. The stems are simple, rather short, somewhat more than a quarter of an inch. Leaves mostly brownish or dingy green, spreading, rather long, and somewhat rigid, nerve strong. Theca ovate or oblong, not contracted at the mouth. Cotyledon long, and retaining the lid after it has separated from the theca.

Gymnostomum. Cryptogamia. Musci. 229

Hab. Moist clayey banks, not frequent. About Edinburgh, Mr Arnott.

Plant growing in patches, somewhat straggling, including the seta half an inch high or more, altogether a more slender and graceful plant than the following. Stem short. Leaves somewhat spreading, lanceolate, yellowish, shining green, more distinctly reticulated than the next, and not so succulent in substance. Theca pyriform, very neat, shining, red-brown, much contracted at the mouth. Lid plane or very slightly convex.—This is one of those species which has a white membrane at the mouth, and I have observed it nearly quite complete in specimens gathered on the banks of Loch Lomond.


Hab. Moist places, ditch banks, &c. abundant. Margin of Duddingston Loch in the utmost profusion.

Plant of a pale green before maturity, growing in crowded patches, more than half an inch high, including the seta. Leaves broadly obovate, acute, spreading, concave, serrate towards the apex. Theca much larger than in the preceding, and not so regularly pyriform. Calyptra with a long subulate beak, cleft at the margin into several deep segments.


Hab. Sandstone rocks, not frequent. Auchindenny woods, Mr Arnott. A very small moss, scarcely more than a quarter or one-third of an inch in height. Leaves of two kinds, the exterior ones short and broad, the inner ones narrower, all entire, erect. Seta very slender, yellowish. Theca cylindrical-oblong, yellowish, delicate. Lid shortly rostrate. The mouth of the theca is furnished with an annulus, which, unless the plant be in a good state, is liable to be overlooked.


A small species, so like Weissia controversa that the mouth must be examined in order to distinguish the one from the other. It grows in small dense patches, and, including the seta, is about a quarter of an inch high. Stem short. Leaves very much crisped when dry. Theca ovate-oblong, much contracted at the mouth, and furnished, if examined when recent and perfect, with an annular white membrane, arising from the outer wall of the theca.

16. ANICTANGIUM.

(The only British species of this genus. It differs from Gymnostomum in having a pyriform calyptra, and grows on rocks and stones in subalpine stations.)

1. A. ciliatum, leaves ovate, lengthened out and diaphanous


Plant with a hoary whitish-green aspect, and growing in depressed tufts. Stems branched, 1 inch long or more; many of the branches rather short, thickly imbricated with leaves. Leaves rather dull, pale green, without a nerve, terminated more or less by a white apex. Theca subsessile, short, truncate, with a wide mouth, yellow-brown, buried among the perichaetal leaves at the extremities of the small branches.—A variety of this, for I can scarcely esteem it a species, occurs with the leaves destitute of the white apex. It is found in Ireland, and is the *A. imberbe* of *Musci Brit.,* and *Gymnost. imberbe* of E. B. t. 2237.

17. TETRAPHIS.


Hab. Dry banks in woods, and about the roots of old trees. Rosslyn and Auchindenny woods.

Plant growing in widely spreading tufts, of a delicate yellowish green colour, and much crowded. Stems nearly an inch long, branched, erect. Leaves entire, acute, pellucid, the nerve disappearing below the point. Setae half an inch long. Theca pale yellow-brown, erect. Peristome of 4 long erect teeth. More common than the fruit, are little cup-shaped receptacles produced on distinct plants, containing gemmae, or minute roundish, reproductive bodies, bearing an exact analogy, as Dr Hooker has observed, to the anthers of the Jungermannia.—A singular genus. Calyptra resembling that of an Orthotrichum. The four teeth are remarkably large for the size of the theca; according to Mr Brown, each of them is marked by seven longitudinal striae, which, if the portions were separated, would render the number of teeth 32. This contributes, as Dr Hooker well observes in *Flora Londinensis,* to place the genus in a natural series between *Splachnum* and *Orthotrichum.* See Brown in *Linn. Trans.* 12. p. 579, and *Hook.* in *Fl. Lond.* New Series.


Hab. Sandstone rocks, on the roof of caves and hollows. By the riverside at Rosslyn, Brown. Bilston Burn, Maughan. Near Kirkcaldy, Mr Chalmers. Arniston and Auchindenny woods, abundant, Messrs Arnott and Greville.

A small moss scarcely half an inch high, of a dark, olive-green or blackish-brown colour. Stem scarcely any. Leaves few, linear, and being longer than those of the perichaetium, give a peculiar, minutely-bristly appearance to the surface, on which the plant grows, (usually in a crowded manner.) Perichaetal leaves few, ovate, imbricated. *Theca* ovate, small. Peristome of 4 large teeth.—I feel much pleasure in restoring to this extraordinary moss its original specific name; the true *T. ovata* being now ascertained to be correctly figured by Schweiggerchen, and really to want the linear-leaves.
SPLACHNUM. CRYPTOGRAMIA. MUSCI. 231

18. SPLACHNUM.
(All the species agree in a strikingly vasculose structure, and in the columella being longer than the theca, and capitulate. They grow, some on dung, others on the ground, chiefly in mountainous countries.)


Han. Bogs on the plains as well as on the mountains, growing on the dung of animals or on the ground. Pentland Hills, very rare. Maughan.

Stems either very short or half an inch long, sometimes branched. Leaves pale green, numerous, lanceolate, acuminate, serrate. Seta 1-3 inches long, slender, fine red or orange. Theca, including the apophysis, large, handsome, fine yellowish pink or purplish.—One of our finest Splachnum, but very rare about Edinburgh.

19. CINCLIDOTUS.

1. C. fontinaloides.

Han. In streams, on stones or wood, not frequent. Water of Leith below Colinton, G. Don.

Stems 2-6 inches long, much branched, thickly clothed with dark, dull green leaves. Leaves lanceolate, (in young plants oblong-lanceolate), acuminate, entire, flexuose, the nerve very strong; crisped when dry. Theca on very short sete, half buried among the leaves at the ends of small branches, oblong, brown. Lid conical-acuminate, slightly curved. Peristome fine red, irregularly anastomosing at the very base, then divided into capillary, slightly twisted teeth.

20. TORTULA.

* Leaves furnished with diaphanous hair-like points.


Han. Walls and stones, excessively common.

Plant scarcely an inch high, tufted, hoary. Stem very short, Leaves dark green, spreading. Seta erect. Theca oblong, erect. Lid more than 1/3 of the length of the theca. Peristome much twisted, orange red.


Han. Sandy banks, roofs, trees, and wall-tops, very common.

Plant growing in thick, wide tufts, often covering a large space of ground, or a whole roof; most conspicuous in moist weather, when (especially if
the shoots be young) it is of a yellowish-green colour, and the spreading recurved leaves are very evident; in dry weather it has often a dingy and somewhat hoary appearance. Stems 1–2 inches long, branched. Setae above half an inch long, orange-red. *Theca* cylindrical oblong, slightly curved. Lid half as long as the theca. *Peristome* long, and much twisted.

**Leaves destitute of white hair-like points.**


*Hab.* Clay-banks, moist rocks, and walls. On a wall by the road-side opposite Parson's Green, Mr D. Stewart.

A rather small species, scarcely an inch in height. *Stems* very short, growing in small patches. *Leaves* dark green, spreading, very rigid, mostly oblong, but sometimes broadly ovate, and very obtuse, (as in the specimens found by Mr. Stewart). *Nerve* very strong and broad, partly concealed by the very involute margin. *Peristome* slightly twisted, the teeth rather short.—This is an addition to the rich list of Scottish mosses, and interesting from being the variety with broad obtuse leaves.


*Hab.* Banks and earth-capped walls, very frequent.

*Plant* an inch high or more, growing in thicketish tufts. *Stems* very short, about ⅓ of an inch or less. *Leaves* bright green, spreading, entire. *Seta* erect. *Theca* long, slightly curved, reddish. *Lid* ⅓ of the length of the theca. *Peristome* very long, tubular, the teeth free only at the apex.


*Hab.* Rocky places on the mountains. Pentland Hills at Habbie's How and elsewhere, but never in fruit.

*Plant* growing in very dense tufts, or rather, large, even, broad masses, of a mostly light green colour. *Stems* 1–2 inches long, branched, thickly clothed with leaves. *Leaves* long, undulate and spreading when moist, but much crisped when dry, the nerve entire, not reaching beyond the point. *Seta* above an inch long, erect. *Theca* cylindrical, a little wider at the base than at the mouth, which is furnished with a twisted, red peristome, the teeth free.

ENCALYPTA. CRYPTOGRAMIA. MUSCI. 233

HAB. Banks, moist fields, and wall-tops, very common.

A variable plant, chiefly in the size of the stems. Stems half an inch to nearly 2 inches high, branched, clothed with spreading and sometimes recurved leaves. Leaves lanceolate-subulate, varying somewhat in their length and acuteness, but not in any other characters, entire, the nerve reaching to the point, but very rarely beyond it. Seta less than an inch long, often becoming lateral from the innovations of the stem. Peristome fine crimson, twisted, the teeth free.


HAB. Banks and wall-tops. Walls near Musselburgh, Mr Arnott.

Plant, as Drs Hooker and Taylor justly observe, with the habit of T. fallax; it grows in tufts. Stems slender, \( \frac{1}{4} - \frac{3}{4} \) of an inch high, more or less branched. Leaves lanceolate, acute, remarkably revolute, with a strong nerve, and crisped when dry. Seta yellowish, slender, about half an inch high. Lid somewhat oblique, subulate, a little shorter than the theca.


HAB. Banks and wall-tops, common.

This species, like T. fallax, is a very variable plant in regard to size. Stems more or less branched, one-fourth of an inch to above 1 inch in height. Leaves oblong- or linear-lanceolate, nearly plane or slightly undulate, entire, the nerve terminating more or less in an apiculus; they are fine deep green, and slightly crisped when dry. Seta scarcely half an inch long. Theca ovate-oblong. Lid very subulate, nearly as long or as long as the theca. Peristome fine red, the teeth lax, free and twisted.

21. ENCALYPTA.

(A genus remarkable at first sight, from the extinguisher-like calyptra).


HAB. On moist rocks, rare in fruit. Pentland Hills, Mr Arnott. Rocks on the west side of Arthur's Seat; never in fructification in either place.

Stems 1-2 inches long, sometimes branched, tufted. Leaves linear-oblong, entire, numerous. Seta less than an inch long. Theca cylindrical, orange-red, beautifully striate in a spiral manner. Lid subulate, near half as long as the theca. Peristome long, the teeth filiform. Calyptra much longer than the mature theca.

Hab. Crevices of moist rocks on the mountains. Pentland Hills, in several places; particularly abundant at Habbie's How, towards the upper end. 

Plant growing in tufts. Stems one-fourth, to above an inch long, branched, thickly clothed with leaves. Leaves oblong, entire, with a strong nerve, which terminates in a coloured or transparent apiculus. Seta not half an inch long. Theca reddish-brown, erect. Peristome short. Calyptra yellowish, shining, concealing the mature theca, ciliate with triangular teeth at the base.—I find vars. α and β of the Muscologia running completely into each other. γ, rhaplocarpa I conceive to be really distinct.


Plant growing in wide patches. Stems very short, scarcely branched, often very crowded. Leaves entire, spreading, with a strong nerve, generally of a dingy green, except the youngest. Seta not half an inch long. Theca cylindrical. Lid subulate, fine orange at the base. Calyptra not so delicate, so scarioso or shining as the last, quite entire at the base, and concealing the theca.

22. GRIMMIA.

* Theca sessile.


Hab. Rocks, stones and trees, in damp situations, and even in rivulets, very common.

A very variable plant. Stems sometimes growing in small dense tufts on stones, at other times lax, and floating in the water, much branched, and from 1-3 inches in length or more. Leaves ovate-lanceolate, the nerve either reaching to the apex, or prolonged into a diaphanous point; more or less imbricated, varying in colour according to situation, being very dark, or even blackish, when growing in or near water. Theca ovate or turbinate, sessile at the ends of the branches. Lid bright red, with a short beak. Teeth of the peristome deep red, spreading.—Notwithstanding the variation in the habit of this plant, it is not difficult to determine, if the fructification is attended to.

2. G. maritima, stems short, pulvinate; leaves lanceolate, acuminate, nearly erect, crisped when dry, their margins re-
curved, the perichaetial ones with their nerve running beyond the summit; theca ovate, sessile, the lid shortly rostrate. **Theca furnished with a seta.**

3. *G. trichophylla*, stems elongated; leaves lanceolate-subulate, carinate, recurved at the margin, ending in a diaphanous, hair-like point; seta curved and flexuose; theca ovate-elliptical, furrowed, the lid rostrate.

This plant I at first considered a variety of *Trichostomum patens*, and connected with *T. funale* of Schwaegrichen. An accurate examination of the peristome proved it, however, to be quite distinct, and to approach very near to *Grimmia pulvinata*. *Trichostomum funale* has the peristome of a *Trichostomum*, and, like *T. patens*, of which it is a variety, has a much wider mouth, a character very striking, in the examination of the peristome.

This plant, which brings the genera *Grimmia* and *Trichostomum* nearer than ever to each other, I discovered on a wall by the side of the road from Edinburgh to Lanark, about seven miles from the former place, in company with Mr Arnott.

4. *G. pulvinata*, stems short, pulvinate; leaves narrow-elliptical, their margins recurved, summits with a diaphanous hair; theca ovate, striate, the lid conico-acuminate; seta recurved.

5. *G. leucopsea*, stem rather short, slightly branched; leaves vate, dark lurid green, with long, white, piliferous points; seta exserted, very short, erect; capsule ovate, the lid obtusely ros-
trate; teeth of the peristome short, perforated. *Grev. in Wern.*

**Trans. v. 4. p. 87. t. 6.**

_Hab._ Subalpine rocks. King's Park, very abundantly.

*Plant* growing in tufts, and often covering a considerable surface of rock. *Stems* simple, or slightly branched, one quarter to half an inch high. *Leaves* loosely imbricated, nervèd, concave, blackish-green, produced at the apex into a long, diaphanous, serrulate point, which, in the uppermost leaves, is thrice as long as themselves. *Seta* straight. *Theca* dark reddish-brown, rarely rising higher than the piliferous summits of the leaves.

This plant, in dry weather especially, has a blackish appearance, which, joined to the silvery hoariness produced by the piliferous points of the leaves, has a peculiar effect. I trust the above characters will keep it distinct from all those to which it bears affinity, as _G. compestris_ of Burdell and Hooker, _G. lavigatus_ of Bridel, and _G. obtusa_ of Schwaebrichen.


_Hab._ Rocks and stones, rare. Loose stones of the debris above Stenton wood, Pentland Hills, G. Don.

A very small moss, the whole plant not being half an inch high, often much less. *Stems* short, in little tufts, with dark green, acute, piliferous, suberect leaves. *Seta* short, not rising above the leaves. *Theca* ovate, small, with a short, obtusely rostrate lid, and red peristome, the teeth of which are entire, and therefore differing from its nearest ally _G. ovata._

### 23. PTEROGONIUM.


*Plant* covering stones and rocks; of a graceful habit. *Stems* 1–2 inches long, branched, closely imbricated with leaves, which are close and glossy in dry weather, but, when moist, spread, and make the branches appear twice as thick as before. *Leaves* of a fine green, very numerous. *Seta* not an inch long, erect. *Theca* suberect, oblong-cylindrical.

### 24. WEISSIA.

*Leaves* ovate-lanceolate.


_Hab._ Moist banks. Wall-top near Kirkliston, Mr Arnott. *Stems* from a quarter to half an inch high, often crowded together. *Leaves* bright green, imbricated, erecto-patent, entire, furnished with a strong
Cryptogamia.


_Hab._ Crevices of rocks and gravelly banks; most common in sandstone countries. Craigmillar, Maughan. King's Park, Mr Arnott. Pentland Hills; Arniston, Rosslyn, and Auchindenny woods.

_Plas_ having much the habit of a _Tortula_, as Mr Turner long ago observed.

_Stems_ tufted, varying in length from half an inch to near 2 inches, slightly branched or simple. _Leaves_ long, rigid, much crisped when dry, reddish on the lower part of the stems, deep green above, the nerve strong, dark. _Seta_ above half an inch in length. _Theca_ ovate-cylindrical, erect, reddish-brown. _Lid_ about one-third as long as the theca, rostrate.


_Hab._ Posts and rails, old thatched roofs, &c. Braid Hermitage, G. Don. Binny-Craig, Dr Fleming.

_Plas_ growing in small roundish tufts, of a pleasant green colour. _Stems_ half an inch long or more, branched, covered with very crisped carinate leaves, with recurved margins, which is the principal character to distinguish it from _W. crispula_. _Seta_ little more than a quarter of an inch long. _Theca_ ovate, with a subulate lid, half its length.—_W. crispula_, its nearest ally, has not been found nearer Edinburgh than between Kincardine and Alloa.


_Hab._ Banks in rather dry situations, very common; plentiful in the King's Park.

_Plas_ very small, growing in dense patches, and closely resembling _Gymnostomum microstomum_. _Stems_ sub-simple, scarcely more than a quarter of an inch high, crowded. _Leaves_ subulate, incurved at the edge, exceedingly curled and crisped when dry. _Seta_ about 2 lines long. _Theca_ erect, dilute brown.—A great deal smaller than the preceding, and growing always on banks.


_Hab._ Rocks, chiefly of sandstone. Salisbury Craigus; and at Bilston Burn, G. Don. Bevlewlaw Burn, Maughan. Habbie's How, in the Pentland Hills, Mr Arnott and Mr Palgrave. Rosslyn and Auchindenny woods.

A minute species, not a quarter of an inch long, very slender, with very
subulate, erect leaves; and a seta so much arched when growing, or moist, as to distinguish it from any other.


_Hab._ Moist rocks. Auchtertool Linn, Fifeshire.

_Plaunt_ growing in tufts, and often exposed to trickling water. _Stems_ half an inch to above one inch long, branched, almost always incrusted more or less below, with white, apparently calcareous matter. _Leaves_ plane, erect, of a fine green, entire, acute. _Seta_ about half an inch long. _Theca_ ovate, with an obliquely rostrate lid, shorter than the theca.


_Stems_ an inch long or more, branched, forming tufts of a dark and often olive-green colour. _Leaves_ glossy, very attenuated, mostly subsecund, but not always. _Seta_ often lateral, from the innovations of the stem, above a quarter of an inch long.

25. **DICRANUM**.

(This genus equals Gymnostomum, in the great difference of _habit_ and _structure_ to be found among the species. In the fructification alone do they agree.)

_Div. I._ Leaves bifarious. (*Fissident, Hedw._)


_Hab._ Moist banks, and woods, frequent.

A charming little plant, the stems varying from a line to an inch in height, but mostly 2-4 lines, ascending. _Leaves_ quite bifarious; each of them nerved, and bifid above the nerve for about half the length of the leaf, that is, divided into 2 lamellae, which embrace the stem, and often the base of the leaf immediately above. _Seta_ 2-4 lines long, red. _Theca_ erect, or subcurnuous.


_Hab._ Moist banks, bogs, &c. not unfrequent. Pentland Hills. Rosslyn and Auchindenny woods.

_Stems_ 1-4 inches long, often branched. Much resembling large varieties of the preceding, and, after the different perichaetial leaves, best distinguished by the lateral fruit.

DICRANUM. CRYPTOGRAMIA. MUSCI.

Hab. Moist banks in woods. Colinton woods, Maughan. Slateford; Braid Hermitage; Rosslyn and Auchindenny woods.

Stems half an inch high or more, several forming a distinct tuft, the tufts crowded. Leaves bifarious, deep green, rather rigid, the lower part above the nerve composed of 2 lamellae, as in the preceding species. Seta half an inch long, springing from the very base, several from the same tuft. Theca suberect, the lid rostrate.

DIV. II. Leaves inserted on all sides of the stem.

* Leaves without a nerve.


Hab. Moors. Pentland Hills, Mr Arnott. (Very frequent, but never in fructification).

Plant of a whitish colour, forming very dense, even, large, broad tufts. Stems 1-6 inches long. Leaves closely imbricated, erect, very vasculose and reticulate. Seta half an inch long, dark-coloured, as well as the ovate, cernuous theca.

** Leaves furnished with a nerve.

† Nerve very broad.


Hab. Peat bogs, and moors. Near St David’s, Fifeshire, Mr Arnott.

Plant growing in crowded patches, of yellow-green colour. Stems rarely half an inch long, mostly much shorter, numerous. Seta plentiful, shining, yellow, half an inch long or less, very slender. Theca very small, somewhat cernuous, yellowish. Lid obliquely subulate, as long as the theca.


Hab. Moist peat-bogs and wet rocks. Pentland Hills, rare in fruit.

There are two varieties of this moss. In the first, the stems are from half an inch to 1 inch long, pale green, and often fructifying; the other is 1-4 inches long, of a blackish hue, and very rare in fruit. The striate theca, flexuose seta, and fringed base of the calyptus, render it abundantly distinct.—The leaves are often very fragile, and may be seen lying on the tufts.

†† Nerve narrow.

7. D. flavescens, stems branched; leaves long, lanceolate, serrulate, pointing in all directions, crisped when dry; theca

*Hab.* On wet sand under the banks of rocky rivers. Between Slateford and Colinton, Mr E. Maughan. Auchindenny woods.

*Stems* tufted, 1-4 inches long, branched. *Leaves* long, narrow, serrulate at the apex, the nerve running to the point. *Seta* not half an inch long. *Theca* erect, oblong. *Lid* obliquely rostrate, nearly as long as the theca.


*Hab.* Sides of sandy streams on the mountains, and in oozy spots or well-heads. Pentland Hills, rare, Mr J. Stewart.

Those stems which produce fructifications are rarely so long as 2 inches, but sterile ones, which are found in large masses in mossy sources of mountain streams, are often 4 inches long. *Leaves* of a pale yellow-green colour, often golden yellow. *Seta* less than an inch long. *Theca* sub- cernuous, and furnished with a struma in all my specimens, though placed in another section by Dr Hooker.


*Hab.* Sandy banks of rocky streams. Colinton woods; Rosslyn woods and Bilston Burn, Maughan. Pentland Hills, Mr J. Stewart. Auchindenny woods, very plentiful.

*Stems* tufted, branched, 1-2 inches high, mostly erect, but often ascending, and the sets then forming an angle with the stem. *Leaves* dark green, not so long as those of *D. flavescens,* but otherwise resembling them. The chief specific distinction lies in the cernuous theca.


*Stems* growing in dense roundish tufts, half an inch to 1 inch long, branch- ed. *Leaves* lanceolate, with a long subulate point, bright green, very much crisp when dry. *Seta* not half an inch long. *Theca* slightly cernuous, with a rostrate, subulate lid, scarcely more than half the length of the theca.

HAB. Woods and rocks. Pentland Hills.

Stems growing in tufts, 2-4 inches long or more, branched, robust. Leaves long, sometimes secund, shining, flexuose and transversely waved even to the naked eye, but most evidently when dried. Seta 1 to near 2 inches long, solitary, or several, when it becomes D. polysetum of foreign authors. Theca cernuous.


HAB. Woods, banks, and on the mountains, very common.

Stems tufted, 2-6 inches long, branched. Leaves long, not undulate, very subulate at their extremities, bright, and often deep green, more or less secund, frequently falcate. Seta 1-3 from the same perichaetium, 1 to near 2 inches long. Theca arched, not furrowed when old; the lid nearly as long as the theca.


Stems tufted, half the size of the preceding, somewhat branched. Leaves straighter than the last, shorter, more erect, rarely subsecund, somewhat crisped when dry, and generally of a brownish or reddish colour. Seta solitary, nearly an inch long. Theca somewhat obovate, cernuous, somewhat furrowed, with a subulate lid of equal length.


Stem very short, rarely half an inch long, mostly simple. Leaves lanceolate, varying in colour, reticulation, and in the margin being entire or slightly serrate; sometimes secund, and sometimes erect. Seta a quarter of an inch long, reddish. Theca erect or inclined, reddish, with a straight rostrate lid, rarely more than half the length of the theca.

15. D. heteromallum, stems short, branched; leaves subulate, falcato-secund, nearly entire; theca ovate, subcernuous,

_Hab._ Moist banks and hollows by road-sides, very frequent.

_Stems_ growing often in large patches, half an inch to near one inch long, slightly branched. _Leaves_ long, very subulate, erecto-second, and generally falcate, bright green. _Seta_ slender, half an inch long or a little more. _Theca_ usually very numerous, ovate, cernuous, reddish, with a conico-subulate lid, nearly of equal length with itself.

I have not found _Hedwig’s D. subulatum_ in this neighbourhood; it is probably nothing more than a variety of _heteromallum_ to which _Mohr_ has united it.

### 36. TRICHOSTOMUM.

*Leaves with diaphanous points.*


_Hab._ On the mountains, among rocks and stones, and in heathy places, abundant. Pentland Hills.

_Stems_ tufted, 3-9 inches long, branched and irregularly pinnate. _Leaves_ ending in long white hairs, and giving a very hoary appearance to the plant in dry weather. _Seta_ not a quarter of an inch long, springing from the summits of the short lateral branches. _Theca_ ovate, the _lid_ with a rostrate, subulate beak.


_Hab._ Mountains and heaths, on the ground, and on rocks and walls. Pentland Hills, not very frequent in fruit.

_Stems_ tufted, and, when growing on stones and rocks, spreading in a creeping radiating manner, 1-2 inches long; branched, thickly clothed with leaves.—Besides the longer branches, there are often very short ones growing in a distichous manner. _Leaves_ yellowish green when moist, but when dry they become hoary from the diaphanous points. _Seta_ apparently lateral from the innovations of the stem, near an inch long. _Theca_ ovate, or _ovate-oblong_, erect, with an acute, straight, subulate _lid_, as long as itself.


_Hab._ Rocks and stones on the mountains. Pentland Hills, about Hab-bie’s _How_ and elsewhere.

_Stems_ tufted, spreading, somewhat creeping, branched, above an inch long-
Leaves lanceolate, acuminate, serrulate at the diaphanous points; in the dry state more or less hoary, sometimes very highly so. Seta somewhat more than a quarter of an inch long. Theca oblongo-cylindraceous, with a rostrate, subulate lid, scarcely more than half the length of the theca. Teeth of the peristome rather short, not long and filiform, as in T. evanescens, which character, joined to the longer theca, shorter seta, and much shorter lid, will sufficiently distinguish this species.

**Leaves not diaphanous at their points.**


Hab. Wet rocks and stones in mountainous places, sometimes even in the water. Rosslyn woods by the river-side, Maughan. Pentland Hills, in the streams, and at Habbie’s How, abundantly. Auchindenny woods, on large stones in the stream.

Stems loosely tufted, 1-2 inches long, slightly branched in a fasciculated manner, mostly naked below, and leafy above. Leaves generally dark green, or almost black, imbricated, very obtuse. Seta not more than half an inch long, twisted when dry. Theca erect, oblong. Lid straight, subulate, not so long as the theca.


Hab. Mountain rocks and heaths. Pentland Hills, Sir J. E. Smith-Craigmillar, Maughan. (Rare in fruit near Edinburgh.)

Stems somewhat tufted, on rocks, or forming large patches on the ground, 1-3 inches long, branched; many of the branches very short, and often crowded. Leaves lanceolate, acute, very rarely indeed with any diaphanous points, yellowish green in the young branches, the rest often blackish. Seta about half an inch long. Theca erect. Lid straight, subulate, not quite so long as the theca.


Hab. Rocks and stones in subalpine districts. Summit of Corstorphine Hill. Among some large loose stones near Habbie’s How.

Stems forming roundish compact tufts, of a pleasant green colour, half an inch to above one inch long, branched, robust. Leaves long, entire, except at the apex, extremely crisped when dry. Seta half an inch long or less. Theca numerous, erect, ovate-oblong. Lid subulate, straight, nearly as long as the theca. Teeth of the peristome filiform, in pairs.—A beautiful moss.
37. DIDYMODON.

* Theca inclined.


Hab. Heaths, walls, &c.; especially in bare spots where fires have been made. On thatched roofs, growing several inches long, but then rarely fructifying. Very common.

Stems most commonly half an inch long, but varying much in length, somewhat tufted, or growing in large patches. Leaves constant in their characters, brownish green, or reddish. Seta an inch long, fine pink or purplish. Theca purplish red, polished, always furrowed when old. Lid conical. Teeth of the peristome often connected by transverse bars.

** Theca erect.


Stems somewhat tufted, from 3 lines to 2 inches long, branched, slender. Leaves rather loose, distant, the nerve strong, but disappearing at, or a little below the point, never exerted and rigid as in D. rigidulum, its nearest affinity. Seta varying in length from half an inch to one inch. Lid rostrate, not two-thirds of the length of the theca.


Stems densely tufted, branched, slender, flexuose, 1–6 inches long. Leaves long, subulate, shining, bright green. Seta an inch long, very slender. Theca ovate, erect, reddish. Lid conical.—Very distinct from all other British species.


Hab. Moist banks in woods and subalpine situations, especially in little naked hollows. Pentland Hills and Coast of Fife.

Stems somewhat tufted, commonly half an inch long, branched. Leaves very slender and subulate, more or less secund. Seta an inch long.
Polytrichum. Cryptogamia. Musci. 245

Theca erect, ovate. Lid conical. Teeth of the peristome filiform, 16, in rather distant pairs.

38. Polytrichum *.

(A very natural genus, with an outer peristome of short incurved teeth. Mouth of the theca closed by a horizontal membrane, constituting an inner peristome. Nerve of the leaf more or less winged.)

* Calyptra naked.


Hab. Moist banks and woods, very common. Stems 1-2 inches high, simple, erect. Leaves thin, undulate, crisped when dry, toothed at the margin, very different from those of the rest of the genus. Seta an inch long or more. Theca cernuous, curved. Lid subulate, nearly as long as the theca.—The leaves curl up almost immediately after gathering.

** Calyptra hairy.

† Leaves entire, their margins involute.


Hab. On heaths and wall-tops, frequent. King's Park, under Sampson's ribs. South side of the reservoir on the Pentland Hills, abundant. Stems scarcely an inch high, simple, naked below, and bearing a tuft of crowded, hair-pointed leaves at the summit. Seta above an inch long, reddish. Calyptra, when young, often pink.


* That Polytrichum is possessed of an inner peristome, there can I think be no doubt. It is merely modified; and so is that of several other genera, as Orthotrichum, Anomodon, Buxbaumia, Fontinalis, &c. It should be considered, that the membrane which closes the mouth of Polytrichum is not merely stretched across it, but passes to the base of the outer teeth, and lines them to the very apex, and thus forms a real membraneous inner peristome. This structure is easily seen, if the membrane be carefully removed from a ripe theca; the margin may be seen even by the naked eye to be beautifully cleft into as many segments as there are teeth. In P. alpinum the above structure is extremely evident. Vid. Crev. and Arnott on the Genera of Mosses in Wern. Trans. v. 4. p. 115.
cated with subulate, involute leaves, never diaphanous at the points. *Seta* 2-3 inches long, fine red. *Lid* scarcely conical, but with a short, rostrate point. *Calyptro* large, pale at the base, fine reddish-orange towards the apex.—A fine species, best distinguished from the preceding by the absence of the piliferous points to the leaves, and by the twice or thrice longer sets.

†† *Leaves serrate, their margins plane.*


α. *yucefolium*, stems a span or more in height; leaves with their margins of the same colour; theca acutely quadrangular, its apophysis very distinct. *P. commune*, *Smith*, E. B. t. 1197.

β. *attenuatum*, stems 3 or 4 inches in height; leaves shorter, their margins pellucid; theca obtusely quadrangular, the apophysis indistinct. *P. attenuatum*, *Smith*, E. B. t. 1198, and *P. gracile*, t. 1527.

Hab. Moors and heaths on the mountains and plains. α. and β. frequent; both on the Pentland Hills.

Stems varying in height, as will be perceived in the characters of the varieties, from 2 to above 12 inches, very rarely branched. *Seta* 2-4 inches long, robust, reddish or yellowish. *Theca* large, erect, or slightly inclined. *Calyptro* large, orange, very hairy. *Teeth* of the peristome 64.


Hab. Banks on the mountains. Pentland Hills, (eastern Cairn Hill), Messrs Somerville and E. Maughian. Among the rocks above Swanston wood, and several other places on the Pentlands.

Stems 2-4 inches long, more or less branched in a fasciculate manner. *Leaves* long, narrow, serrate, patent. *Seta* not much above an inch long. *Theca* more or less ovate, scarcely at all quadrangular. *Calyptro* not long, and the hairs rather short.—The apophysis is so variable as not to be depended on. The seta is always very much shorter than the preceding.


Hab. Sandy or gravelly banks, in subalpine situations. In the old quarry, Auchindennay woods, abundant. Pentland Hills.

Stems 1-2 inches high, more or less branched in a fasciculated manner, often naked below. *Leaves* glaucous, green, broader than the last, acute, serrate. *Seta* 1 to near 2 inches long. *Theca* cylindrical, with a conical-subulate lid.—The root penetrates a considerable depth into the ground, and is liable to be broken.
7. *P. aloides*, stems short, leaves linear-lanceolate, obtuse, their margins plane and serrate, especially at the extremity, as well as the keel; theca roundish or cylindrical, without an apophysis.


Hab. Moist banks, on heaths, &c.; very common. All the varieties on the Pentland Hills; Auchindenny woods, and elsewhere.

Stems varying in height, often crowded, mostly simple. Leaves erecto-patent, rather short. Seta varying much in length, and the theca in form; the latter is erect or suberect, and destitute of apophysis. Teeth of the peristome 32.—Var. β, has a much shorter and a more campanulate calyptra, and its peristome appears more exserted. Var. γ, seldom exceeds half an inch in the length of the stem, but has one or several little branches, each bearing a theca on a very short seta; whilst the last year’s old theca remains on what was once the termination of a simple plant.

39. *FUNARIA.*


Hab. Walls, banks, roofs, almost every where.

Stem very short. Leaves bright green, imbricated and connivent at their summits. Seta 1 to near 2 inches long, remarkably flexuose, and curved while young, on exposure to moisture. Theca pyriform, oblique, the mouth not being in the centre at the apex. Calyptra very scarioso when young, erect, and concealing the theca; but it gradually becomes oblique, and the beak at a right angle with the theca before it falls.

The teeth of the peristome lie over the mouth, and the outer ones, which are much longer than the inner ones, are twisted by their filiform summits into a little knot, which can never be disentangled without injuring them, on account of the small transverse bars which project on each side the teeth, and rivet, as it were, the summits together.

40. *ORTHOTRICHUM.*

*A very natural genus in habit, growing in tufts on rocks or trees. Two of the British species are destitute of the ciliary processes which form the inner peristome*.

* Peristome without ciliary processes.


Hab. Rocks and stones, frequent. King’s Park.
**Peristome with 8 ciliary processes.**


_hab._ On trees (rarely stones). Frequent on bushes in heathy or sub-alpine situations. Rosslyn and Auchindenny woods and Pentland Hills, abundantly.

_stems_ forming roundish tufts, nearly an inch high. _Leaves_ bright green, often with a rich yellow tinge, exceedingly crisped when dry. _Seta_ much exserted. _Theca_ long and tapering down into the seta.—One of our most common but most beautiful Orthotricha.


α, _majus_, stems very short; calyptra, especially above, pilose. *O. affine*, _Smith*, E. B. t. 1323.


_hab._ Trees, frequent. _α_, Very common.

_stems_ tufted, from less than half an inch to above 1 inch long, branched. _Leaves_ lanceolate, rather pale green, soft, spreading. _Theca_ sessile, furrowed. _Peristome_ with 8 slender cilia, and 8 very much reflexed and revolute teeth, of a whitish colour, and opaque substance, marked by 3 longitudinal lines, but never divided.—Large plants, with the habit of *O. striatum* occur, but an examination of the peristome is at once sufficient to distinguish the one from the other.

5. *O. rupincola*, leaves suberect, straight, rigid, broadly lanceolate; theca sub sessile, slightly striate towards the mouth;

HAB. Rocks, King's Park, Mr Arnott. Auchindenny woods, on a mass of rock in the middle of the river. May.

"Strikingly different at first sight," as Dr Hooker correctly observes, "from *O. affine*, in its very rigid texture, and straight and almost erect leaves, and in the capsules, which are much broader, and wholly desti-
tute of furrow" (except towards the mouth, and in age). "The pe-
ristome is composed of 16 outer teeth, which are never united in pairs, and the operculum, which is short, is flat at the base, with the beak su-
ddenly set on, and of a reddish-brown colour, whereas in *O. affine*, it tapers gradually into the beak, and is of a yellowish-white colour. Indeed, the
whole plant of *O. rupestris* is vastly browner than that of *O. affine*; and in this respect, and in rigidity, coming nearer to *O. Hutchinsiae*." In addition to the above excellent observations kindly communicated to me by Dr Hooker, I have only to add, that the outer teeth, which are either spreading or somewhat revolute, are marked with a longitudinal
line, and are very frequently bifid at the apex, and perforated or even lacunose, somewhat in the manner of Schwaegrichen's figure of *O. ru-
pestro*. The ciliary processes, under a high power, are divided by a lon-
gitudinal line into 2 rows of cellules, as indeed are those of *O. affine*. The size of the plant (which grows in tufts), is from half an inch to 2 inches in length.

It was first found in this country by Mr Starke, on rocks by the river Clyde. Besides the above stations, I have recently found it on the Castle Hill, Stirling; near Callender; and at Loch Earn-head.

### Peristome with 16 ciliary processes.

6. *O. diaphanum*, stems short; leaves lanceolate, acuminate, their points diaphanous; theca sessile; peristome with 16 ci-

HAB. Rocks and walls. Trees in the old Botanic Garden, G. Don. Near Newhaven, on old willow-trees by the road-side from Trinity to the
Chain-Pier. Abercorn Park, Duddingston.

Stems forming little tufts, scarcely half an inch high, often much less. *Theca*
subsessile, half immersed among the leaves; but the best distinguishing character is the pellucid, hair-like points of the leaves, which may be seen by the naked eye.

7. *O. pulchellum*, stems short; leaves patent, narrow-lanceo-
late, crisped when dry; seta exserted; peristome with 16 slender ciliary processes; calyptra subpilose, plicate at the base.

HAB. Trees, especially the Ash and the Hazel. Near Dalkeith, G. Don.
South Queensferry, Mr Greene. Rosslyn and Auchindenny woods, abundantly, Messrs Arnott and Greville. Trees and bushes on the banks of the Logan Water, scarcely a mile below Habbie's How.
Drumshoredale Muir.

Stems tufted, branched, half an inch to near 1 inch long. *Leaves* linear-
lanceolate, somewhat crisped when dry. *Seta* shortly exserted. *Theca*
ovato-cylindrical, striate. **Peristome** of 8 outer double spreading teeth,
of a pink colour, and 16 inner cilia. *Calyptra* scarcely at all pilose, campanulate, very pale, the point coloured, and the base finely plicate.—Without exception, the most beautiful Orthotrichum in this country.


Hab. Trees; rarely on stones. Auchindenny woods, and many other places near Edinburgh.

Stems tufted, branched, 1 to near 3 inches long, robust, and often rather rigid. Leaves lanceolate, acute. *Theca* half immersed among the leaves; not furrowed, as in the following. Teeth of the peristome 16, rather long and narrow; *Cilia* 16, irregularly moniliform.


Hab. Trunks of trees. Swanston wood, Messrs Arnott and Greville. Stems tufted, branched, 1–3 inches long or more, often naked at the base, and drooping. Leaves dark, dull green, long, undulate at the margin, more or less crisped when dry. *Theca* half immersed in the leaves, oblong, with a long apophysis. Outer peristome 16 long teeth, recurved when dry. A large species, very distinct, and far more common than I suspected when I gathered it (then new to Scotland) in Kinross-shire. In that county, and in Perthshire, it is found in the utmost profusion; and I have since observed it in many other places, always producing its fruit sparingly. About Edinburgh, it is not so frequent.

41. ANOMODON.


Hab. On the ground, rocks and old trees, chiefly in subalpine countries, not frequent in fruit. Arthur’s Seat. Pentland Hills, &c. abundant. Stems 2–10 inches long, branched, somewhat pinnate, dark shining green, often almost blackish, slightly incrassated at the extremities. Leaves imbricated. Seta short and curved, and the theca cernuous, but at length both are erect. Lid conical.


Stems creeping, and throwing up a profusion of branches 2–6 inches long, which form wide tufts. Leaves imbricated on all sides, erecto-patent, un-
Neckera. Cryptogamia. Musci. 251

dulate, sometimes secund at the extremities of the branches; colour dark but rather bright green, turning yellow in age. Setal an inch long. Theca cylindrical, reddish. Lid conico-rostrate.—The leaves moisten speedily, and expand so much as to give the plant a very different appearance in dry and moist weather.

42. Neckera.


Stems 3–10 inches long, in broad, entangled, drooping tufts, branched, pinnate. Leaves fine, shining, brown-green, strikingly undulate, directed to each side in a distichous manner. Seta half an inch long. Lid obliquely subulato-rostrate, nearly as long as the theca.—A splendid moss.

43. Fontinalis.

(Wholly an aquatic genus, with dark green leaves.)


Hab. In ponds and streams, frequent. Abercorn, near Queensferry, Maughan. In fruit at Rosslyn in the Esk, Mr J. Stewart. In fruit in the Logan Water, in various places, Messrs Arnott and Greville.

Stems floating, 6 inches to 2 feet long or more, much branched. Leaves of a dull deep green colour, imbricated in a trifarious manner, entire, acute, and so much folded as to produce a sharp keel. Theca lateral, usually at the middle or lower part of the stems; elliptical, almost enveloped in the imbricated, roundish scales of the subsessile perichaetium.


Hab. Streams and rivulets, chiefly on the mountains. Water of Leith, near Redhall.

Stems 6 inches to above a foot long, much entangled and branched, with a yellowish or olivaceous hue, and glistening. Leaves lanceolate, acuminate, loosely imbricated, plane or concave, but not in the least keeled. Theca much resembling the last, but smaller.—One of the most striking characters is the glistening or shining appearance, which is so evident, especially when dried, that Bauhin applies to it the epithet lucens, and Dillenius that of sericeus. When recently dried, it has a peculiar smell, somewhat resembling that of woollen cloth before the oil is washed out: this I never perceived in the last species. I have found it both in rapid streams and still water.

44. Buxbaumia.

1. B. aphylia.

HAB. On the ground in woods and heathy places, very rare. Rosslyn, among some fir-trees below the Chapel, Mr E. Maughan.

Whole plant not an inch high, of a red colour, and apparently leafless. Stem none. Seta arising from a brown, scaly, bulbous base, rough with tubercles, erect and strong. Theca large, ovate, oblique, gibbous, flattish above, convex beneath. Peristome with an outer circle of erect, linear, reddish processes, free towards the apex, and an inner, cone-like, plicate, white membrane. Lid conical, obtuse.

The minute brown scales of the bulbous base have been lately ascertained to be true nerveless leaves, excessively minute, of a very vasculose structure, and cleft at the apex into a number of capillary segments, or rather, in all the specimens which I have examined, into a terminating fringe of conferva-like filaments, longer than the rest of the leaf. The discovery of these leaves was made by Mr Robert Brown and the late Mr J. Stewart about the same time, Mr Stewart having mentioned them to his class two or three months before the date of the account published by Mr Brown in Linn. Trans., and which I had not seen when I published some observations on the moss in Wern. Trans. An excellent history and figure of Buxbaumia is given by Dr Hooker in the Fl. Lond. New Series; and additional particulars and dissections will be given by Mr Arnott and myself in the 5th vol. of Wern. Trans.

45. BARTRAMIA.

* Seta long, straight.


a, minor, stem short, leaves flexuose. B. pomiformis, Smith, E. B. t. 998.

β, major, stems much lengthened out, branched; leaves longer, crisped, especially when dry. B. crispa, Smith, E. B. t. 1526.

HAB. Banks and crevices of rocks, chiefly subalpine. Pentland Hills, both a and β, the former plentiful.

Stems tufted, varying in length from half an inch to 3 inches. Leaves numerous, long, very subulate, bright green, spreading, more or less twisted when dry, the nerve passing distinctly near the apex. Seta an inch long, erect. Theca globose, becoming striate when old. Lid convexo-mamillate.


a, major, stems 3-6 inches in length; leaves broadly ovate, acuminate. Bryum fontanum, Smith, E. B. t. 390.

β, marchica, stems from half an inch to an inch in length; leaves lanceolate, acuminate. B. marchica, Smith, E. B. t. 2074.

HAB. Marshy places. a, Often by the sides of alpine rivulets, and in bogs. β, Generally in wet gravelly or sandy spots. Both on the Pentland Hills, and elsewhere.

Stems more or less tufted, varying in length from half an inch to 6 inches. Leaves imbricated on all sides, the stem erect, sometimes falcato-secund,
and then generally very robust. *Seta* 1-3 inches long, erect. *Theca* large, globose, oblique. *Lid* obtusely conical.

**Seta** short, curved.


_Hab._ Mountains and mossy heaths. Pentland Hills in several places, - Messrs Maughan and Greville.

_Stems_ 3-7 inches long, branched; the branches mostly short, and clothed with spreading leaves of a shining yellowish-green colour, not twisted when dry. *Seta* curved and flexuose. *Theca* large, globose, not striate, beautiful.—One of our finest mosses, and I believe still peculiar to Great Britain.

46. **HOOKERIA**.


_Hab._ Moist shady woods. Rosslyn and Colinton woods, and Bilston Burn, Maughan. Auchindenny woods, abundant.

_Stems_ procumbent, 1-3 inches long, somewhat branched, radicating. *Leaves* plane, in four rows, but arranged in a bifarious manner, pale whitish-green, with large reticulations. *Seta* an inch long, erect, of a dark colour, as well as the cernuous, ovate *theca*. *Lid* conico-rostrate. *Colyptra* very pale.—A beautiful moss.

47. **HYPNUM**.

_Div. I._ *Stems* (taken in conjunction with the leaves) plane.

*Theca* erect.


_Hab._ Woods, at the roots and trunks of trees. Colinton woods, Maughan. Braid Hermitage, Mr Arnott. Rosslyn and Auchindenny woods.

_Stems_ entangled, and often covering a large surface, 1-3 inches long, much branched. *Leaves* yellowish shining green, scarcely pointed, but curved somewhat into the form of a broad scymitar, arranged in a bifarious manner. *Seta* not an inch long, erect. *Theca* ovate. *Lid* nearly as long as the *theca*, conical, with a subulate point.


_Hab._ Trunks of trees, common; but rare in fruit.

_Stems_ often covering the bottom of the trunks of old trees, and generally more or less drooping, 2-6 inches long, much branched in a pinnate man-
ner. Leaves pale shining green, nerveless. Seta scarcely half an inch long, not thrice as long as the perichaetium. Theca shortly ovate, with a rostrate lid.

** Theca cernuous or inclined.

3. H. riparium, leaves ovate-lanceolate, more or less attenuated into a long point, entire, the nerve reaching nearly to the summit, or less; theca oblong, cernuous, the lid conical. Hook. Fl. Scot. 2. p. 141. Smith, E. B. t. 2060.

Han. Banks of ditches, and moist places occasionally overflowed. Very abundant at Duddingston Loch among the reeds.

Stems, when growing in the water, 3–7 inches long, much branched, and the leaves lanceolate-subulate; when growing out of the water, spreading in small, lax patches, much shorter, and the leaves lanceolate-acuminate; somewhat shining; not always obviously placed bifariously. Seta near an inch high. Theca ovate, with a very short conical lid.


Han. Banks in heathy places, and in woods. Rosslyn woods, Maughan.

Auchindenny woods, and many places on the Pentland Hills.

Stems 3–8 inches long, often almost simple, or slightly branched, growing in lax masses. Leaves whitish-green, somewhat shining, undulate. Seta near 2 inches long, erect, slender. Theca arched and cernuous, well marked by being furrowed. Lid conical, acuminate.


Han. Banks in woods, about the roots of old trees, and similar places.

Braid Hermitage; Rosslyn and Auchindenny woods, &c.

Stems 1–2 inches in length, somewhat branched, subdecumbent. Leaves bright, shining green, disposed in a bifarious manner, more or less acuminate. Seta an inch long or more. Theca varying in form, from short-ly ovate to cylindrical. Lid conical, slightly beaked.—The var. obtusifolium (H. Donianum, E. B.) I have not seen in this neighbourhood. It differs, in having the leaves more obtuse, slightly concave, and not so regularly bifarious.

Div. II. Stems (taken in conjunction with the leaves) more or less cylindrical, never plane.

Sect. I. Leaves spreading on all sides of the stem.

A. Leaves uniform in their direction (not squarrose).

a. Nerve reaching to the point.

6. H. tenellum, leaves fasciculate, erect, lanceolate-subulate,

Hab. Rocks and old walls, chiefly in calcareous countries, not common. Side of a cave on the sea-shore near Kirkcaldy, Mr Arnott. Base of the rock at Craiglockhart.

Stems forming small, spreading, almost velvety patches, of a yellowish but deep green colour, not an inch long, branched, slender. Leaves small, acuminate, straight, having somewhat of a rigid appearance, shining. Seta scarcely half an inch long. Theca small, ovate, cernuous. Lid as long as the theca, conical, with a subulate point.


Hab. Trunks of trees near the ground, decaying wood, &c., very frequent.

Plant spreading in green patches, with the short capillary stems and branches interwoven and subprocumbent. Leaves very minute, entire, varying greatly in the length of the nerve. Seta not an inch long. Theca arch'd and cernuous. Lid conical, short.—A delicate, very slender moss.


Hab. Trees, rocks, and stones, not common. On stones in the small plantation opposite the bleachfield, Slateford, Mr Arnott.

Stems 1-2 inches long, creeping, and covering stones, &c. in dark green, shining patches, especially when dry; branches very short, erect. Leaves lanceolate, acuminate, serrate chiefly towards the point, suberect. Seta not half an inch long. Theca ovate, dark red-brown, subcernuous. Lid conical, acute, not so long as the theca.

b. Nerve shorter than the leaf; or none.

* Leaves entire; ovate or elliptical.


Hab. Woods and banks, very common, but rarely producing fruit freely. In profusion on the Pentland Hills under the Juniper bushes.

Stems in large lax tufts, intermixed with other plants, 4-12 inches long, compressed, slender, branched, pinnate, mostly reddish, and shining through the leaves of the main stem. Leaves pale, yellowish, shining green. Seta an inch long. Theca ovate, cernuous, dark red-brown. Lid conical, with a dark rostrate point; nearly as long as the theca.

10. *H. purum,* leaves closely imbricated, oval, with a very

**Hab.** Woods and banks, very common, but less so in fruit.


**Leaves entire ; lanceolate or subulate.**


**Hab.** Moist rocks and stones, especially in the beds of alpine rivulets. Pentland Hills. The rocks and stones at Habbie's How are covered with it.

Stems 1-6 inches long, irregularly branched, generally forming a dense matted covering to stones, &c., particularly if the water occasionally passes over it. *Leaves* dark brown-green, except towards the ends of the branches, where they are of a rich glossy yellowish-green, and mostly secund. *Seta* about half an inch long. *Theca* shortly ovate, dark brown, cernuous. *Lid* conical—This plant sometimes is larger in all its parts, and the whole of a pale yellow-green colour. The specific characters must then be carefully attended to.


Stems short, scarcely more than half an inch long, slightly branched, forming small, and often rather dense tufts. *Leaves* spreading, and sometimes appearing almost bifarious, generally, but not always, secund at the summits, shining. *Seta* not an inch high. *Theca* inclined, pale. *Lid* conical, short.


**Hab.** Rocks, wall-tops, trees, very abundant.


14. *H. rufescens*, leaves erecto-patent, lanceolate, acuminate,

**β. tenuis**, stems slender, subprocumbent; leaves somewhat secund.

**Hab.** Mountain rocks, very rare in fruit. **β.** on the Pentland Hills, rare.

**Stems** 1-6 inches long, tufted, branched, erect or somewhat creeping. **Leaves** lanceolate-acuminata, striate, entire, the two nerves at the base so short and faint as to be perceived with difficulty; **colour** usually a fine shining reddish pink or purple, rarely simply green. **Seta** an inch long. **Theca** ovate-oblong, suberect. **Lid** conical, with a short beak.

**Var. β.** is the form in which it occurs on the Pentland Hills; in this state, the stems are only one inch long, very slender, and either tufted or decumbent, and straggling. The leaves retain their characters, but are much smaller and subsecund. This variety bears a strong resemblance to **var. polyanthos** of **H. cupressiforme**, and also to the foreign **H. incurvatum**, from which, however, it is distinct.

15. **H. lutescens**, leaves erecto-patent, lanceolate, acuminate, entire, striated, nerve disappearing below the point; theca ovate, cernuous, the lid conico-acuminate; seta rough. **Hook. Fl. Scot.** 2. p. 143. **Musc. Brit.** p. 100. t. 25. **Smith, E. B.** t. 1445.

**Hab.** Trunks of trees and bushes near the ground; also on banks, frequent. In fine fructification beneath the wall of Caroline Park next the sea, Maughan.

**Stems** much branched, 2-4 inches long; branches spreading, mostly short. **Leaves** yellowish-green, shining, striate, sometimes serrulate towards the apex, according to Hooker. **Seta** not an inch long, erect, dark red, as well as the slightly cernous **theca**. **Lid** conical, with a short beak.


**Hab.** Bogs. Pentland Hills, Messrs G. Don and Maughan. (Rare, especially in fruit, but occurring in several spots.)

**Stems** 2-5 inches long, slightly branched; branches beset with short branchlets, sometimes in an irregularly pinnate manner. **Leaves** lanceolate-subulate, entire, striate, of a golden yellow colour, and shining so much as to give the whole moss a splendid appearance. **Seta** near 2 inches long. **Theca** cernuous, with a short, conical **lid**.


**Hab.** Sandy heaths and bogs. Pentland Hills, Mr Arnott. (Intermixed with **H. nitens**, in the valley on the other side of the rocks above Swanston Wood.)

**Plant** of a very pale, almost whitish-green colour, branched, or nearly
simple, 1–3 inches long. Leaves imbricated, erect, shining, especially when dry, much acuminated, slightly striate. Seta above an inch long, dark red. Theca shortly ovate, dark brown. Lid conical, with a short beak.

*** Leaves serrate. Stems naked below.


Hab. Moist woods, on the ground, and on shady rocks by the sides of streams, usually near the water. Colinton woods, Maughan. Braid Hermitage; Pentland Hills; Arniston, Rosslyn, and Auchindenny woods.

A very fine moss, creeping at the base. Stems erect, not crowded, often rather scattered, 2–4 inches high, naked below, but bearing a large head of branches. Leaves dark green, serrate towards the apex, rather obtuse, striate. Seta not an inch long. Theca ovate. Lid rostrate, two-thirds of the length of the theca.


Hab. Woods, bogs, moist pastures, &c. frequent. In fruit on the Pentland Hills. Banks above the sea west from Pettercur; and elsewhere. Stems 2–4 inches high, erect, naked below, but with a tuft of erect or spreading, shining, yellowish-green branches. Leaves rather loosely imbricated, striate. Seta an inch long or more, dark red, 3–20 or more. Theca erect, about one-third longer than the straight, conico-rostrate lid.

—The columella is often fixed to the lid, and retains it for some time after it has separated from the theca.

**** Leaves serrate. Stems leafy below.


Hab. On trees and rocks, very frequent.

Stems in lax tufts, 2–3 inches long, much branched; branches somewhat erect, curved, acute. Leaves imbricated, concave, rather tumid, serrate towards the apex, the nerve sometimes forked. Seta near an inch long. Theca ovate, erect, light reddish. Lid conico-rostrate, not so long as the theca.

HAB. Trees and rocks. Auchindenny woods, Mr Arnott. Pentland Hills.

Stems in lax tufts, more slender than the preceding, acute. Leaves acuminate, serrate nearly the whole length, the margin reflexed. Seta above half an inch long. Theca ovate, scarcely quite erect. Lid rostrate.

† Stems bi-tri-pinnate.


HAB. Heaths and banks, common. In the utmost profusion on the Pentland Hills, under the juniper bushes.

Stems in lax tufts, 6-12 inches long, branched, tripinnate. Leaves yellowish-green, very shining. Seta an inch long, dark red. Theca ovate, cernuous. Lid rostrate, nearly as long as the theca.


HAB. Woods and banks, frequent. In fruit at Auchindenny, and elsewhere.

Plant of a dull opake green, not in the least shining. Stems 3-6 inches long, branched, tripinnate, proliferous, or one stem arising from another in a sudden abrupt manner. Leaves imbricated, striate. Seta above an inch long, fine dark red. Theca ovate, cernuous, deep red-brown. Lid conico-rostrate.—H. recognitum, E. B. t. 1495, has not been found in Scotland. After an accurate investigation of authentic specimens, I can find no character to distinguish it from H. proliferum, except that the stems are only bipinnate, and the lid not so much rostrate. It also wants the proliferous mode of growth. These differences, however, can scarcely be termed specific, though they mark a singular variety.


HAB. Woods, on the ground and trunks of trees, very frequent.

Stems sometimes loosely tufted, but more or less struggling in its mode of growth, 2-6 inches long, branched, more or less pininate or bipinnate, somewhat proliferous or lengthened out, with occasional intervals of naked stem. Leaves rather opake green, lax. Seta about an inch long, or rather less. Theca ovate, cernuous. Lid conico-rostrate.

†† Stems irregularly branched; (H. piliferum is sometimes sub-pinnate.)

25. H. piliferum, stems somewhat pinnate; leaves ovate, with
a long narrow acumination, serrate, nerve disappearing below
the middle; theca ovate, cernuous, the lid conical, with a mi-
*Smith,* E. B. t. 1516.

**Hab.** Woods and banks, not common. Braid Hermitage, Mr Arnott
Auchindenny woods, Messrs Arnott and Greville; producing fruit in
both places.

**Stems** straggling, 2–9 inches long, sometimes subpinnate, but as frequently
branched in a most irregular manner; branches often distant. *Leaves*
shining green, pale or dark, concave, those of the stem with their acu-
mimated summits resembling a hair-point to the naked eye, especially
when dry. *Seta* an inch long. *Theca* ovate, cernuous. *Lid* conical,
acute, with a minute mucronate dark point.—The lid of this moss has
been erroneously figured and described in E. B. as subulate, and as ro-
strate by the authors of *Muscologia Britannica.*

26. *H. rutabulum,* stems variously branched; leaves patent,
ovate, acuminate, serrate at the point, striate, their nerve reach-
ing half way; theca ovate, cernuous, the lid conical; *seta*
*H. brevirostre,* *Smith,* E. B. t. 1647, and *H. crenulatum,* E. B.
t. 1261.

**Hab.** Trees, banks, walls, and stones, very common.

**Stems** procumbent, matted, and covering stones, &c., branched, 2–4 inches
long. *Leaves* bright shining green, imbricated, ovate-lanceolate, some-
what striate. *Seta* about an inch long, dark red, rough with minute tu-

27. *H. velutinum,* stems variously branched; leaves erecto-
patent, ovate, often approaching to lanceolate, acuminate, ser-
rate, striate, nerve reaching half-way; theca ovate, cernuous,
t. 2421.

**Hab.** Hedge-banks, on the ground, and on roots and trunks of tree near
the ground, very common.

**Stems** short, 1–2 inches long, branched, and forming rather dense, entangled
patches, of a bright, and often yellowish green colour. *Leaves* ovate-lan-
ceolate, lax. *Seta* scarcely more than half an inch long, rough. *Theca*
shortly ovate, cernuous, dark red. *Lid* conical, rather obtuse.

28. *H. ruscifolium,* stems variously branched; leaves loose-
ly imbricated, subpatent, broadly ovate, acute, serrate, concave,
their nerve reaching nearly to the summit; theca ovate, cer-

**Hab.** Stones and wood in streams, especially subalpine rivulets. Pent-

**Stems** floating, 3–9 inches long or more, branched, often naked below when
growing in rivulets (always in old plants) from the action of the water.
*Leaves* dark or almost blackish-green, except in the young branches,
where they are yellowish, shining green; large, broad, with the nerve
sometimes reaching to the very point. *Seta* rather more than half an inch long. *Theca* shortly ovate. *Lid* obliquely and acutely rostrate.


**Hab.** In woods and shady places on the ground, and on stones and trunks of trees near the ground, common. Braid Hermitage; Granton, Rosslyn, and Auchindenny woods.

**Stems** in wide, lax tufts, 2–8 inches long, rather straggling. *Leaves* spreading, broad, serrate, very striate, even to the naked eye. *Seta* an inch long, fine red, quite smooth. *Theca* red, cernuous. *Lid* obliquely rostrate, as long as the theca.


**Hab.** Banks, trees, old walls, &c. Slateford, Mr Arnott. Rosslyn woods, Mr Palgrave.

**Stems** lax, 1–2 inches long, branched; branches short. *Leaves* pale shining green, loosely imbricated, the nerve faint. *Seta* half an inch long. *Theca* ovate, cernuous, pale. *Lid* subulate, not so long as the theca.

**B. Leaves squarrose.**


**Hab.** Bogs and sides of streams, very frequent. Pentland Hills, and Duddingston Loch in the utmost profusion.

**Stems** loosely tufted, erect, 3–8 inches long, branched; side-branches short, summits of the uppermost branches, and especially of the main stem, acute. *Leaves* yellow, shining green, spreading and slightly squarrose below, but not so decidedly as could be wished for a place in this section. *Seta* 2 inches long or more. *Lid* conical.


**Hab.** Bogs and sides of streams, rare in fruit. Duddingston Loch in fruit, G. Don; (I have also found it since abundantly). Ravelrig-toll Moss and Pentland Hills, Maughan.

**Stems** erect, in lax tufts, usually slightly branched. *Leaves* broad, cordate, nerved, entire, rather scattered, squarrose, pale, shining green, often


*Hab.* a. in wet places and sides of rivulets on the hills. b. on rocks and wall-tops. a. on the Pentland Hills, not unfrequently. b. on wall tops near Arniston, by the road-side.

*Stems* 2-3 inches long or more, rather straggling, branched, often procumbent. *Leaves* squarrose, very acuminate, reddish-brown or golden-yellow in a, and shining, yellowish-green in b. *Seta* above an inch long. *Theca* cernuous. *Lid* conical, with a short point.—*Var. β* is rare in fruit.


*Stems* 6-12 inches long, branched; most of the branches short, spreading. *Leaves* squarrose, shining, often falcato-secund at the summit of the stem and main branches. *Seta* an inch long, dark red. *Theca* roundish-ovate, dark red. *Lid* conical.


*Hab.* Woods and banks, very common. In fruit at Auchindenny woods, abundantly.


*Hab.* Woods, banks, heaths, &c. very common.

*Stems* lax, branched, 3-10 inches long; somewhat pinnate with lateral short branches, which are often acuminate. *Leaves* shining green, much recurved. *Seta* an inch long, deep red, as well as the roundish ovate *theca*. *Lid* conical, with a very short beak.
**Sect. II. Leaves secund.**

*Leaves with a single nerve.*


*Hab.* Banks of streams, stones in rivulets, wet rocks, &c. abundant. Bilston Burn, G. Don. Colinton; Skateford; Rosslyn and Auchindenny woods; Pentland Hills.

*Stems* creeping, throwing up abundance of crowded, erect branches, 1-2 inches high. *Leaves* generally of a dark livid green, more or less secund, especially at the extremities of the branches. *Seta* an inch long. *Theca* not very cernuous. *Lid* conical, acute.—Plant subject to much variation in size, colour, and direction of the leaves.


*Hab.* Bogs and sides of subalpine streams. Pentland Hills.

*Stems* rather rigid, 2-3 inches long, erect, branched, somewhat pinnate, mostly reddish or yellowish. *Leaves* well distinguished by the strong nerve running completely to the point; cauline ones the broadest, with nerve reddish. *Seta* an inch and a half long. *Lid* shortly conical.—When this plant grows in water, its habit is somewhat changed and less pinnate.


*Hab.* Bogs, frequent. Pentland Hills, both varieties.

*Stems* 2-4 inches long, branched, varying in colour from green to reddish or yellowish or purple black. *Leaves* varying in length, remarkably falcate in some varieties, especially one with long straggling prostrate branches, of a blackish purple. *Seta* near 2 inches long. *Lid* shortly conical.

40. **H. fluitans**, leaves loosely imbricated, the upper ones falcato-secund, all lanceolate-subulate, scarcely serrate at their

HAB. Pools and slow streams; wet bogs. Pentland Hills, not frequent, and never in fructification.

*Stems* varying from 2 to 13 inches in length, according to situation; lax, slender, branched, producing fruit on the shorter specimens in spots occasionally inundated. *Leaves* green, reddish, or dark purple, lax, spreading, often rather distant: very much falcate in short plants, but less so in those always floating. *Seta* 2–3 inches long. *Theca* curved. *Lid* conical, acute.


HAB. Moist banks and stones, especially in a red clayey soil and sub-alpine countries. Slateford; King's Park; Pentland Hills.


*Stems* in large, often drooping masses, 3–9 inches long, branched, pinnate. *Leaves* deep green, the nerve not reaching to the summit as in H. *fili-cinum*. *Seta* an inch and a half long. *Lid* conical, with a very short acute point.—A much larger and greener plant than H. *fili-cinum*.

**Leaves without a nerve, or with two very indistinct ones at the base.**


HAB. Wet bogs. Pentland Hills near Currie, and at Ravelrig-toll-moss, a few yards west of the *Salix* catroma, but never in fruit.


44. H. *cupressiforme*, leaves closely imbricated, more or less falcato-secund, lanceolate, acuminate, entire except at the points, which are usually serrate, very faintly 2-nerved at the base;


β. compressum, stems slender, compressed; leaves falcato-secund. H. compressum, Linn.

γ. tenue, stems very slender, compressed; leaves very slightly curved, narrow-lanceolate, quite entire. H. polyanthus, Smith, E. B. t. 1664.

Hab. α, on trees, rocks, walls, &c., very common. β, in woods, not unfrequent. γ is rarer, but sometimes met with in Rosslyn and Auchindenny woods.

Stems 2-6 inches long, branched, often somewhat pinate, procumbent, entangled in a dense, matted mass, varying greatly in thickness. Leaves shining green, varying, as marked above in the characters of the varieties. Seta an inch long or less. Theca mostly subcylindrical and slightly cernuous; in a robust variety, common on wall-tops, frequently ovate, and rather more cernuous. Lid conico-rostrate. Var. γ differs the most from the common habit of the plant.


Hab. Woods and shady banks on the ground, very rare. Pentland Hills, Mr J. Stuart. (No one ever found it in this station except that botanist; he could not recollect the spot.)

Stems growing in suberect lax tufts, 3-6 inches long, branched, pectinate with close branchlets. Leaves bright shining green, much falcate. Seta above an inch long. Lid obtusely conical, with a minute point.—A beautiful species.


Hab. On the ground and on rocks, frequent. Slateford; Braid Heritage; King's Park, &c. In fructification at Habbie's How.

Stems growing in entangled, matted procumbent tufts, 1-3 inches long, branched, not so regularly pectinate as the preceding. Leaves yellowish, shining green, with a crisped and curled appearance, destitute of strie. Seta an inch long, cernuous. Theca ovate, cernuous. Lid conical, very acute.

48. BRYUM.

Div. I. Theca furrowed.

1. B. palustre, stems branched; leaves lanceolate, obtuse, entire, their margins revolute; theca ovate, oblique, sulcate, the

**Hab.** Bogs. Pentland Hills, above Swanston Wood and elsewhere.

*Stems* 2-6 inches long, more or less branched, robust. *Leaves* long, pale, yellow green, often intermixed with a mass of ferruginous tomentose roots. *Seta* 2 inches long, appearing lateral from the innovations of the stem. *Theca* ovate, in age oblong. *Lid* conical.

**DIV. II.** *Theca* smooth.

**SECT. I.** *Teeth* of the outer peristome shorter than the inner one. (*Meesia.*)


**Hab.** Bogs and marshes, not frequent. King's Park, G. Don. Guillon Links, Mr Arnott.

Whole plant about an inch and a half high. *Stems* about a quarter of an inch long, sometimes crowded, subsimple. *Leaves* erect, yellowish or reddish. *Seta* fully an inch high. *Theca* nearly erect, dark brown, gracefully pyriform, with a very obtuse *lid.* The outer teeth are but little shorter than the inner ones.

**SECT. II.** *Teeth* of the outer peristome as long as the inner one.

**A.** *Leaves* without any thickened margin.

*Leaves* subulate. (*Webera.*)


**Hab.** Chiefly on sandstone rocks, but also on the ground, and in conservatories. Pentland Hills near Currie, Mr Arnott. In many greenhouses about Edinburgh.

*Stems* from scarcely any to half an inch long, slender. *Leaves* bright, shining green, spreading, very long and setaceous, the extremities consisting wholly of the thick nerve. *Seta* 1-2 inches long, very slender. *Theca* pendulous, shining as if varnished. *Lid* conico-convex.

*Leaves* acuminate or acute. (*Never subulate.*)

† *Nerve* disappearing below the point.


**Hab.** Moist banks and crevices of rocks, not frequent. Pentland Hills, Mr Arnott. Craiglockart.
Sterns simple, half an inch to one inch high, tufted. Leaves pale, yellowish, shining green, erect. Seta nearly an inch long. Theca long, inclined. Lid conico-convex.


Hab. Moist banks and sides of ditches, not frequent. Colinton woods, Mr J. Mackay. Bevelaw Burn, G. Don. Banks above Colinton.

Stems from two lines to half an inch long, branched, and often bearing innovations, which makes the fruit appear lateral. Leaves dull green, erect. Seta half an inch long, reddish. Theca small, pendulous, pinkish red. Lid convex.


Hab. Walls, roofs, and on the ground, extremely common; growing even in towns.

Stems densely tufted, from a quarter to half an inch long, branched, of a fine silvery appearance. Leaves very closely imbricated, pale whitish green. Seta above half an inch long. Lid of the pendulous theca convex.

7. B. Zacii, stems branched; leaves closely imbricated, more or less broadly ovate, acuminate, very concave, reticulated, entire, nerve running nearly to the point; theca clavate, cernuous. *Hook.* Fl. Scot. 2. p. 150. *Musc. Brit.* p. 120. t. 29. *Smith*, E. B. t. 1021.

Hab. Moist rocks in alpine countries. Habbie's How, Mr E. Maughan. King's Park, Dr Sealy.

Stems growing in small tufts, half an inch long, branched, with a silvery aspect like the last. Leaves with a reticulation also like the last. Seta half an inch long. Theca very long and drooping. Lid convex.

†† Nerve reaching to or beyond the point.


Hab. Banks and in woods, very rare in fruit. Braid Hermitage; Granton woods; Auchindenny woods, &c.

Stems 1-2 inches long, bare of leaves below, and having them expanded above in a horizontal, stellate manner. They are frequently proliferous; in which case, another stem rises from the centre of the leaves, often in its turn producing a third. Seta an inch long or more, 1-4. Theca rather large. Lid obtusely conical.

9. B. capillare, stems short; leaves obovate, twisted when dry, entire, their nerve produced into a hair-like point, their

*Hab.* Walls, roofs, rocks, &c., very common.

*Stems* densely tufted, half an inch to near an inch long, branched. *Leaves* spreading when moist, twisted when dry in a spiral manner, especially at the summit of the stems, when the hair-like point is very conspicuous. *Seta* an inch long. *Theca* long, pendulous, reddish. *Lid* very shortly convex.

10. *B. caspititium*, stems short; leaves ovate, acuminate, entire or very obscurely serrate at the points, the margins slightly recurved, the nerve reaching to, or beyond the point; theca between ovate and pyriform, pendulous. Hook. Fl. Scot. 2. p. 150. *Musc. Brit.* p. 121. t. 29.


*β. minor*, B. *bicolor*, E. B. t. 1601.

*Hab.* Banks, wall-tops, roofs, &c., very common. *β. between Burntisland and Aberdour, Mr E. Maughan.*

*Stems* densely tufted, from 3 lines to half an inch long, branched. *Leaves* more imbricated, and more rigid than the preceding, not twisted at the summits of the stems when dry. *Seta* not an inch high. *Theca* much shorter than the last. *Lid* conical.


*Hab.* Wet rocks, and banks of mountain rivulets.

*Stem* always branched with innovations, and including the innovations, 1-2 inches in length or more; innovations slender, often pale pink or delicate glaucous green, with the leaves lax, and not crowded. *Seta* 1-2 inches long. *Theca* pendulous, rather long; pyriform, pale yellowish brown. *Lid* convex.


*Hab.* Heaths. Pentland Hills, frequent.

*Stems* sometimes scattered, often crowded, scarcely more than a quarter of an inch long. *Leaves* erect, narrow, shining. *Seta* fully an inch long, of a bright red or yellow; in *β* only half an inch. *Theca* quite pendulous, pale reddish brown. *Lid* very shortly conical.


Stems 1-4 inches long, branched with innovations. Leaves mostly reddish or brownish, with a strong dark nerve; erecto-patent. Seta 1-2 inches long. Theca long, yellowish or reddish, pendulous. Lid shortly conical.

B. Leaves with their margins thickened.

*Leaves entire.*


HAB. Moist woods and stream-sides, on rocks and among the roots of old trees. Rosslyn and Colinton woods, Maughan. Auchindenny and Swanston woods; Habbie's How, and elsewhere in the Pentland Hills.

Stems 1 to near 2 inches high, erect; sterile ones flagelliform, 2-4 inches long. Leaves roundish, large, dark green, spreading, distant. Seta an inch long. Theca large, ovate, drooping. Lid conico-rostrate.

**Leaves denticulated.**


HAB. Moist woods and shady places. Abercorn woods, abundantly, Maughan. Braid Hermitage; Granton woods; and a little wood by the canal side, opposite Craiglockhart, in profusion.

Stems creeping below ground, above, simple or branched with a few spreading innovations; 2-3 inches high. Leaves long, distant, spreading, light green. Seta 1-6 or more, an inch long.


HAB. Moist places; wet rocks and stream-sides. Abercorn woods, Maughan. Banks of the Esk above Musselburgh, Mr Arnott. Braid Hermitage and Habbie's How.

Stems half an inch to one inch high, simple. Leaves rather large, broad, scattered, the nerve running to the point or beyond it. Seta 1-5, an inch long. Lid rostrate, half as long as the theca.

17. B. marginatum, stems elongated; leaves ovate, acute, reticulated, their margins thickened, serrate, nerve reaching a

Hab. Moist woods and sides of streams. Banks of the Esk above Musselburgh, Mr Arnott. Habbie's How.

Stems about an inch high, erect, simple. Leaves distant, dark green, the margin and nerve usually of a red colour. Seta an inch long. Lid very shortly rostrate.


Hab. Moist rocks and stumps of old decaying trees, frequent. Rosslyn, Auchindenny, Arniston, Swanston, and Granton woods, &c.

Stems often crowded, 1-2 inches long or more, erect, simple. Leaves light green, long, the nerve and margin reddish. Seta an inch long or more. Theca large, pale orange red when old.


Hab. Shaded banks, often among stones; at the roots of trees in moist places. Craiglockhart, rare.

Stems erect, about an inch long, simple; sterile ones 1-2 inches long, arched, and taking root at the extremity. Leaves bright green, lax, with a cuspidate point, formed by the excurrent nerve. Seta an inch long. Theca pale reddish yellow when old.

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VI. HEPATICÆ. *Juss.*

49. JUNGERMANNIA *.

Div. I. *Plants frondose.*

* Frond destitute of a nerve.

1. J. pinguis, frond oblong, decumbent, nerveless, fleshy, nearly plane above, swelling beneath, irregularly branched, the margin sinuate; fruit arising from the under side near the margin; calyx very short, the mouth fimbriated. *Hook Fl. Scot. 2. p. 118. *Jung. t. 46. *Smith, E. B. t. 185.


Fronds either spreading horizontally and lax, or very crowded, and growing upright in dense tufts, 1-3 inches in length, and variously branched;

* The characters of this genus are chiefly taken from the excellent Monograph of the British species, published by Dr Hooker.
substance opaque, brittle, and fleshy; the surface shining. Colour pale yellow green. Calyptra cylindrical, exserted. Theca of a dark colour, on a thick peduncle, 2, or even 3 inches long.


Hab. Bags and moist rocks. Glassmont. Old quarries at Corstorphine Hill. Rosslyn and Auchindenny woods, &c.

Fronds generally tufted, and somewhat imbricated, half an inch to one inch in length, very narrow, more or less branched in an irregularly pinnate manner, the pinna also furnished with short branchlets. Substance carnose. Colour yellow green. Calyptra exserted, tuberculose. Peduncle of the theca scarcely an inch high.

**Fronds furnished with a nerve.**


Hab. Moist banks, and at the base of shady rocks, rare in fruit. Auchindenny, Rosslyn and Arniston woods; in fruit at each station. May and June.

Fronds growing either singly or in patches, procumbent, closely adhering to the ground in a somewhat radiate manner, simple or slightly branched, half an inch to one inch long, dilated and obtuse at the apex, carnose, deep bright green. Calyptra rarely exserted. Peduncle of the theca scarcely an inch long.—For a complete description of this, the most curious of all the *Jungermannia*, the student is referred to Dr Hooker's work above cited.

5. *J. epiphylla*, frond oblong, submembranaceous, irregularly divided, obsoletely ribbed, the margin entire, or lobed and sinuate; fruit arising from the superior part of the frond near the apex; calyx subcylindric plicate; calyptra exserted. *Hook*. Fl. Scot. 2. p. 118. *Jung*. t. 47. *Smith*, E. B. t. 771.

Hab. Moist sandy, rocky places, frequent.

Fronds growing usually in broad patches, and imbricated, closely attached to the ground by their radiating filaments; 1–2 inches or more in length, half an inch or more broad, smooth, waved at the margin, subsimple or slightly branched, the apex obtuse and rounded, or somewhat divided into short segments; nerve broad, indistinct. Calyptra roundish. Peduncle of the theca 2–3 inches long, thickish.


Hab. Trunks of trees in shady woods, frequent.

Fronds in dense patches, closely imbricated, and pressed to the surface on which they grow, half an inch to above one inch long, very narrow,
equal, branched dichotomously; glabrous on the upper surface, pale green, in one variety blueish; nerve narrow.—I have not seen the fruit, which is very rare, but the calyptra is described by Hooker as "beset on every side with many white, rigid hairs or bristles. Peduncle about thrice as long as the calyptra."


Hab. Trees and shady rocks, especially in subalpine situations. Rosslyn and Auchindenny woods, &c.
Froinds much resembling those of the preceding species, except in being of a paler colour, and pubescent on the upper surface as well as every other part.—They are also usually rather larger, attaining the length of nearly 2 inches.

DIV. II. Plants leafy.

Sect. I. Stipules none.

7. J. setacea, stem creeping, branched in a somewhat pinnate manner; leaves imbricated on all sides, binous, setaceous, jointed, patent, incurved; fruit terminal on short branches; calyx oblong, the mouth expanded, ciliate. Hook. Fl. Scot. 2. p. 111. Jung. t. 8.

Hab. Moist shady and mossy places. Auchindenny woods.
Stems exceedingly slender, in tufts, or solitary among Sphagnum and Dicranum glaucum, half an inch to two inches long, irregularly branched in a distant lax manner. Leaves very minute, setaceous, in pairs. Colour pale green. Peduncle a quarter of an inch long.

B. Leaves bifarious.

* Leaves undivided.


Hab. Moist shady woods and banks, common. Occasionally in fruit about Edinburgh.
Stems either tufted or straggling and subsolitary, 1–5 inches long, simple, or once or twice branched, procumbent or suberect. Leaves large, alternate, in 2 rows, roundish, the margin ciliate, with slender teeth. Peduncles of the theca 1- to near 2 inches long.—Colour of the whole plant dull pale green.


Hab. Rocks, and on the ground, not frequent. Aberdour.
Plant minute, growing in small patches. Stems about half an inch long, mostly decumbent and simple, or nearly so. Leaves green, in two rows, slightly imbricating the stem, or (as in var. β. of Hooker) rather distant, and of an almost black colour. Peduncle sometimes appearing lateral from innovations, about two lines long. Calyx large in proportion to the size of the plant.

10. J. Sphagni, stem procumbent, nearly simple (the gemiferous elongations of the stem alone having stipules); leaves orbicular; fruit upon short branches; calyx oblong, attenuated at each extremity, the mouth contracted, toothed. Hook. Fl. Scot. 2. p. 112. Jung. t. 33. Smith, E. B. t. 2470.

Hab. Bogs, especially among the stems of the Sphagna. Glassmont marshes, Fifeshire.

Stems sometimes tufted, but more commonly rather straggling in masses of Sphagnum; 1-3 inches long, rather slender. Leaves brownish or reddish green, in two rows, more or less imbricated, and the rows as it were folded together; entire at the margin, the cellular structure very minute. Peduncle scarcely half an inch long.—This species is remarkable for its large radicular fibres.


Stems either growing in patches or somewhat straggling, an inch or more in length, slightly branched, procumbent, bright green, often tinged with pink. Leaves in two rows, increasing in size in fertile plants to the summit of the stem, somewhat spreading, the cellules of the margin so much larger than the rest as to form a distinct border. Peduncle about half an inch long. Theca very dark. Calyx remarkable from its four angles. Var. β, which I have found near Edinburgh, is chiefly marked by its very slender, filiform stems, and minute, distant leaves.

** Leaves emarginate or bifid, the segments equal.

12. J. orcadensis, stem erect, simple; leaves closely imbricated, erect or patent, cordate-ovate, plane, notched at the extremity, the margins recurved. Hook. Fl. Scot. 2. p. 113. Jung. t. 71.

Hab. Mountains, rare. Pentland Hills, Mr Rigby.

Stems tufted, or straggling among other mosses, above an inch long, green, often brownish. Leaves notched at the end, in two rows, often folded together. The fructification is unknown.

13. J. bicuspidata, stem procumbent, branched in a stellated manner; leaves subquadrate, acutely bifid, the segments acute, straight, entire; fruit terminal; calyx oblong, plicate, the mouth toothed. Hook. Fl. Scot. 2. p. 113. Jung. t. 11. Smith, E. B. t. 2239.
HAB. Moist rocks and banks, frequent.

Stems very slender, branched, half an inch to one inch in length; in patches or straggling. Leaves extremely minute, distant, alternate, very pale green, cleft half way down into two acute segments. Peduncle half an inch long, very slender. Calyx large in proportion to the plant, and produced towards the centre, while the lax branches spread on every side.


HAB. Bogs and moist places. Auchindenny woods, Mr Walker Arnott. Plant very minute, somewhat resembling the preceding. Stems in small, lax, straggling patches, often attached to sphagna, and throwing out numerous radiciferous fibres; nearly an inch long. Leaves very pale green, alternate, in two rows, bifid, the segments incurred. Peduncle scarcely half an inch long. Calyx produced in the centre, contracted and finely ciliate at the mouth.

*** Leaves tri-quadrifid, the segments equal.

15. J. incisa, stem prostrate, depressed, nearly simple; leaves quadrate, waved, subtrifid, the segments equal, here and there toothed; fruit terminal, the calyx obovate. Hook. Fl. Scot. 2. p. 114. Jung. t. 10. Smith, E. B. t. 2528.

HAB. Heaths, bogs, and moist banks. Pentland Hills on the ground, and on tufts of Dicranum glaucum. Plant minute, pale green, growing in dense patches. Stems procumbent, scarcely more than a quarter of an inch long, clustered together, and along with the "numerous crisped and dentated leaves, resembling," as Dr Hooker justly observes, "a tuft of lettuces in miniature." They become larger and more crowded towards the extremity of the stem. I have never seen the fructification, but, according to the above author, the calyx is half a line long, and the peduncle not more than twice that length.

**** Leaves 2-lobed, the segments unequal, conduplicate.

16. J. nemorosa, stem erect, subdichotomous; leaves unequally 2-lobed, semibifid; dentato-ciliate, lobes conduplicate, the inferior ones larger, obovate, the superior ones subcordate, obtuse; fruit terminal; calyx oblong, incurved, compressed, the mouth truncate, dentato-ciliate. Hook. Fl. Scot. 2. p. 114. Jung. t. 21. Smith, E. B. t. 607.


Plant tufted and matted. Stems erect, 1-3 inches long, yellowish green, or often brownish, or even blackish, slightly branched. Leaves spreading, gradually increasing in size towards the summit of the branches, 2-lobed; lobes unequal, dentato-ciliate at the margin. Peduncle not more than a quarter of an inch long. The calyx is at first recurved, at length straight.

17. J. undulata, stem erect, subdichotomous; leaves un-

_Hab._ Moist rocks, particularly abundant in small streams. Pentland Hills, frequent.

*Plant* growing in wide, matted, densely tufted patches. _Stems_ 1–5 inches long, simple or slightly branched, mostly naked below, “their texture rigid, brittle when dry.” _Leaves_ distichous, spreading, the lower ones distant and small, upper ones larger and imbricated; _colour_ varying from dull green to purplish or blackish; upper lobe half the size of the lower one, the margin entire, sometimes slightly waved. _Peduncle_ about half an inch long. _Calyx_ two lines long, broad, compressed and incurved towards the mouth, which is entire and truncate.


_Hab._ Heaths and moist places. Glassmont, Fifeshire.

*Plant* growing either in small tufts or rather straggling, of a pale green colour. _Stems_ not an inch long, sometimes slightly branched, procumbent, except the fructified extremities. _Leaves_ spreading, the lobes nearly equal, except in the lower ones, where the upper lobes are the smallest; margin entire. _Peduncle_ nearly half an inch long. _Calyx_ a line long, compressed at the mouth and minutely denticulate, and while young much incurved.


*Plant* growing in tufts or wide patches, of a pale green colour, or sometimes struggling among other mosses. _Stems_ half an inch to two inches long or more, mostly suberect, but occasionally procumbent and imbricated. _Leaves_ distichous, numerous, spreading, divided into two unequal, conduplicate lobes, serrate at their points, the lower lobe the largest. In the middle of each lobe is a pellucid, whitish mark, somewhat resembling a broad nerve. _Peduncle_ three quarters of an inch long. _Calyx_ a line long, longitudinally plicate.


_Hab._ Moist banks and rocks, rare. By the sides of streams, Fifeshire.

*Plant* growing in dense, pale green patches, closely adhering to the ground by its numerous roots. _Stems_ about a quarter of an inch long. _Leaves_
distichous, increasing in size towards the summit of the stem, entire, both lobes obtuse, the lower one by much the largest. Peduncle two lines long. Calyx obovate, plicate towards the mouth.—I regret I have not been able to ascertain the precise station of this rare Jungermannia.


Hab. Trunks and branches of trees, very common.

Stems closely attached to the branches of trees, imbricated, much and irregularly branched, 1-2 inches long. Leaves bifarious, closely imbricated, the superior lobe much larger than the inferior one, and much rounded, both entire at the margin. Peduncle twice the length of the calyx. Calyx oblong, the apex flat and truncate.—Fructification abundant at all seasons.

Sect. II. Stipulate.

* Leaves entire or occasionally emarginate.


Hab. Moist rocks and wet banks. Bilston Burn, G. Don.

Plants growing in straggling patches, of a pale green, often tinged with brown. Stems 1-2 inches long, more or less procumbent, slightly branched. Leaves bifarious, numerous, roundly 4-sided, entire. "Stipules of a narrow, lanceolate form, divided nearly down to the base into two entire, straight segments." Peduncle three quarters of an inch long. Calyx very short, the two lips cleft and laciniate.


Hab. Banks, heaths, woods, &c. common.

Plants growing in dense, wide patches, pale green. Stems scarcely half an inch long, procumbent. Leaves distichous, crowded, spreading, semi-amplexicaul, the margin entire, rarely notched. Peduncle a quarter to half an inch high. Calyx concealed by the perichaetal leaves.


Plants of a pale, often glaucous green colour, growing in patches, and closely attached to the ground. Stems above an inch long, creeping, slender, simple, except when producing innovations. Peduncle nearly an inch
long, issuing from a lateral calyx above a line long, attached to the stem by one side of its mouth, the rest descending and penetrating the ground. This species produces gemmae in great abundance, in small heads or clusters, supported on the extremities of the stems, which are then elongated into slender, leafless, erect peduncles.

**Leaves bi-trifid, the segments equal.**

25. J. bidentata, stem procumbent, branched; leaves broadly ovate, decurrent, bifid at the apex, the segments very acute, entire, stipules bi-trifid and laciniate; fruit terminal; calyx oblong, subtriangular, the mouth laciniate. Hook. Fl. Scot. 2. p. 110. Jung. t. 30. Smith, E. B. t. 606.

HAB. Woods and moist shady banks, abundant.

Plant in lax straggling tufts, mostly of a pale whitish-green colour. Stems 1-2 inches long, decumbent, generally simple. Leaves numerous, close together, bifarious, decurrent at the lower margin, widely bifid at the apex; reticulation large. Peduncle three quarters of an inch long. Calyx about a line long, laciniate at the apex.—The stipules are sometimes not very obvious, and are omitted in the figure in English Botany.


HAB. Woods, and among rocks. Auchindenny woods. Corstorphine Hill.

Plant either pale or dark green or brownish, growing in patches or straggling tufts among other mosses. Stems 1-3 inches long. Leaves obscurely 4-sided, distichous, close, or rather distant, with 3-5 teeth. Peduncle near an inch in length. Calyx plicate towards the mouth, and irregularly toothed.

27. J. reptans, stems creeping, branched in a stellate manner, somewhat pinnate; leaves imbricated, subquadrangular, incurved, acutely 4-dentate; stipules broadly quadrate, 4-dentate; fruit radical; calyx oblong, plicate, toothed at the mouth. Hook. Fl. Scot. 2. p. 116. Jung. t. 75. Smith, E. B. t. 608.

HAB. Woods and shady places. Auchindenny woods.

Plant pale green, growing in tufts, sometimes straggling among other mosses. Stems 1-2 inches long, very slender, branched in a somewhat pinnate or bipinnate manner, sometimes irregularly. Peduncle three quarters of an inch long. Calyx whitish, oblong, plicate towards the apex, which is toothed.


HAB. Woods and shaded banks in subalpine situations. Dunearn Hill, Fifeshire.
**Plant** growing in rather dense, broad patches, of an olivaceous or brownish green colour. **Stems** 2-5 inches long, creeping, by means of flagelliform shoots which rise from the under side of the stem. **Leaves** distichous, close, rather firm. **Peduncle** above an inch long. **Calyx** whitish, 2 lines in length.

***Leaves bifid, segments unequal, conduplicate.***

† **Lower or smaller segments plane.**

29. *J. platyphylla*, stem procumbent, branched in a pinnate manner; leaves unequally lobed, superior lobes roundish ovate, nearly entire; inferior ones and the stipules ligulate, quite entire; fruit lateral; calyx ovate, compressed, truncate at the mouth, inciso-serrate, longitudinally cleft on one side. **Hook. Fl. Scot.** 2. p. 117. - **Jung.** t. 40. **Smith, E. B.** t. 798.

**Hab.** Woods, rocks, in shaded places, abundant.

**Plant** growing in large patches or imbricated tufts of a deep very dull green colour. **Stems** 2-6 inches long, much branched, lying as it were in layers over each other. **Leaves** distichous, closely imbricated, the upper lobe much larger than the lower one, entire at the margin; reticulation minute. **Peduncle** very short, only just exerted. **Calyx** above a line long. **Theca** very pale, brown, delicate.

30. *J. ciliaris*, stem procumbent; branched in a pinnate manner, leaves very convex, unequally 2-lobed, lobes and lobules ovate, bipartite, fringed with long and slender cilia; stipules subquadrate, 4-5-lobed at the extremity with long cilia; fruit lateral; calyx obovate, contracted and toothed at the mouth. **Hook. Fl. Scot.** 2. p. 117. **Jung.** t. 65. **Smith, E. B.** t. 2241.

**Hab.** Heaths and on the mountains, frequent. Pentland Hills.

**Plant** growing either in rather wide flattish patches or suberect tufts, of a pale green to a brownish or reddish crimson color. **Stems** 1-5 inches long, irregularly branched in a somewhat pinnate or bipinnate manner. **Leaves** beautifully ciliate as well as the stipules, close and imbricated; reticulation large. **Peduncle** scarcely twice as long as the calyx, which is obtusely obovate, much contracted at the mouth.

†† **Lower or smaller segments involute.**

31. *J. serpyllifolia*, stem creeping, loosely branched in a pinnate manner; leaves unequally 2-lobed, superior lobes rounded, inferior ones minute, involute; stipules roundish, acutely bifid; fruit lateral; calyx broadly obovate, pentagonal, the mouth contracted, elevated, subdentate. **Hook. Fl. Scot.** 2. p. 117. **Jung.** t. 42. **Smith, E. B.** t. 2537.

**Hab.** Woods, on rocks and trunks of trees. Auchindenny woods.

**Plant** growing in rather dense, flat and broad patches, of a pale green colour. **Stems** nearly an inch in length, very slender, branched in an irre-

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*Dr Hooker has united his *J. Doniana* to this species in Flora Scotica; but since the publication of that work, we have had the good fortune, in an excursion to the Grampian Mountains, to find the fruit, which was a desideratum. This proves to be terminal, and therefore confirms the species.*
gularly pinnate manner. Leaves closely imbricated, entire at the margin the upper lobe much larger than the lower one, ventricose beneath. **Petun**e a little longer than the calyx, which is obovate, minutely tuberculate, and has the mouth very much contracted.

|+++| Lower or smaller segments saccate. |
|---|---|---|---|

**HAB.** Trunks of trees, extremely common.

**Plant** closely attached to the trees on which it grows, and forming circular imbricated patches of 3 or 4 inches in diameter or more. **Stems** about an inch long, more or less divided into short spreading branches. **Leaves** closely imbricated, generally dark red purple, sometimes brownish-green. **Petun**e a little longer than the calyx, which is obovate, minutely tuberculate, and has the mouth very much contracted.

|33. | **J. Tamarisci**, stem creeping, branched in a pinnate manner; leaves unequally 2-lobed, superior lobes roundish-ovate, inferior ones minute, obovate, saccate; stipules subquadrate, emarginate, the margins revolute; fruit terminal on short branches; calyx obovate, smooth, triangular. **Hook. Fl. Scot. 2. p. 118.** Jung. t. 6. **J. tamariscina**, Smith, E. B t. 2481. |

**HAB.** Trees, bushes, rocks, and on the ground, plentiful. Covering the Juniper bushes on the Pentland Hills.

**Plant** forming large, lax, spreading tufts, (especially on low bushes), of a greenish, deep reddish-brown or blackish colour. **Stems** 2-6 inches long, irregularly branched in a pinnate manner. **Leaves** closely imbricated, involute at the margin, their upper surface shining. **Petun**e a little longer than the calyx. **Calyx** obovate, not verrucose, the “mouth formed by a long and acute tubular point, which divides into 4 equal segments for the escape of the capsule.”

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50. **MARCHANTIA.** Micheli.


**HAB.** Moist or damp places, on the ground, rocks, or on the mould of garden-pots, plentiful.

**Frondis** 1-6 inches long, half an inch broad, branched, spreading, and closely attached to the ground by numerous radical fibres; surface deep green, shining, reticulated; substance opaque. **Fertile receptacles** on peduncles about 2 inches high; **sterile** ones about 1 inch, widely crenate and membranaceous at the margin; the bodies called anthers are imbedded in the disk. Small cup-shaped sessile receptacles, with toothed margins, and containing small, green gemmae, are scattered over the frond.

2. **M. hemispharica**, fertile receptacle subentire or cleft into mostly 5 obtuse marginal segments, subhemispherical; sterile one peltate, pedunculate. **Hook. Fl. Scot. 2. p. 120.**, and **M. an-**
drogyna. *Smith, E. B. t. 503., and M. androgyna, t. 2545. 


Fronds generally about an inch long, one quarter to one-third of an inch broad, branched once or twice in a dichotomous manner, pale green, often reddish at the margin, obscurely reticulated, the margin irregularly crenate, and rounded at the extremities of the branches. Fertile receptacle cleft into 4-6 segments, which are sometimes quite marginal, sometimes half-way to the summit; the peduncle scarcely an inch high, often much less.—M. androgyna I do not believe to be any thing else than the present species.


**Hab.** Moist rocks and banks, rather rare. Braid Hermitage, by the stream side.

Fronds 1-2 inches long, nearly half an inch broad, branched in a dichotomous manner, rounded and lobed at the extremities, the margin entire. **Color** rather deep green. **Surface** reticulated. Peduncles near 2 inches high. Fertile receptacle 4-6-celled. Theca black.

51. **RICCIA. Mich.**

1. **R. glauca**, frond small, branched, once or twice divided, the extremities lobed, glaucous, dotted; fructification imbedded towards the centre. *Hook.* Fl. Scot. 2. p. 110. *Smith, E. B. t. 2546.

**Hab.** On the ground in clayey soils. Fields about Edinburgh.

Fronds fleshy, seldom exceeding a quarter of an inch in length, adhering to the soil, narrow at the base, but becoming wider towards the extremity, where they are above a line broad; several fronds usually grow together in a radiating manner.

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**VII. CHARACEÆ*. Hook. & Lindl.**

52. **CHARA. Vaill.**


**Hab.** Streams, lakes and ditches. Kinghorn Loch.

**Plant** above a foot long, quite smooth, pellucid, green, much branched. Whorls of branchlets (leaves of Smith) spreading. Fructification not plentiful, and scarcely bracteated, appearing to be merely placed in the axils of the upper leaves. Nucules sometimes 2.

* This is a most curious tribe of plants, whose structure I am convinced is by no means yet understood. At present I have only minutely examined the fructification of C. vulgaris. Under a high power of the microscope, the

HAB. Lakes and ditches. Ditches about Edinburgh, Mr Arnott. Ditches about Kinghorn.

*Plant* 2 feet long, green, transparent. **Stem** branched, thickish, the whorls tumid, and, as Smith observes, "if held against the light, are found to be furnished here and there with transverse, often oblique, internal partitions." **Nucules** sometimes 2.—The largest of the genus.


HAB. Slow streams and ditches. Glassmont marshes. Ditches on the south side of Duddingston Loch, plentiful.

*Plant* 1–2 feet long, slender, branched, rather rigid, rough but not prickly, striated, the lower part of the stem reddish. **Branchlets** simple. **Fructification** abundant, 4–5 or more nucules and globules being produced on each of the uppermost branchlets, every nucule being accompanied by 3 or 4 subulate bracteas, of the same nature as the branchlets.

4. C. hispida, stems branched, spirally striated, brittle, rough and armed above with a kind of short spines, some of which point downwards; branchlets simple, each of the uppermost ones bearing several nucules accompanied by 4 bracteas. **Hook. Fl. Scot.** 2. p. 109. **Smith, E. B.** t. 463.

HAB. Ditches and lakes. Guillon Loch, Dr Parsons; (it is still there). Ditches at Glassmont, Fifeshire.

*Plant* above a foot long, the surface abounding with a calcareous substance; well marked by its great fragility and the little clusters of crystalline-looking spines with which the upper part of the stem is beset. The calcareous matter on the surface is far more abundant in this than in the last species.

From an examination of C. vulgaris, I was led to suppose, that the calcareous matter of the stem and branches was the result of some peculiar economy in the plant itself, and not a mere adventitious incrustation, as it evidently originated from within, and was covered by the cuticle. Dr Brewster has since assured me that the above supposition is correct, and that the phenomena exhibited are analogous to those produced by the siliceous deposit beneath the cuticle of the *Equiseta*.—**Vid. p. 214. Note.**

globule is found to be constructed of 7 triangular scales, which, in maturity, separate from each other, and produce the dehiscence of the globule. Each of these scales has a vacant portion in its centre, but the margin (which has a fluted appearance under a small magnifier) consists of a number of parallel, linear-oblong, hyaline hollow tubes, placed at small intervals from each other, those forming the angles of the scale being branched. Within these tubes are a profusion of orange, globular, minute bodies, (exactly similar to the spores of many cryptogamic plants), arranged in no order, and escaping on the least injury to the tubes. It is these little bodies which give the orange color to the globule. Within the globule, is a mass of elastic white filaments, much convoluted, and indistinctly either jointed or transversely rugose.
VIII. ALGÆ. Linn.

Div. I. Fucoideæ. Marine plants, of an olive-brown or green colour, mostly becoming black on exposure to the air. Substance coriaceous or cartilaginous. Texture fibrous. Fronds mostly continuous, cylindrical or expanded. Fructification granules solitary and imbedded in the substance of the frond or in tuberculated receptacles.—Many species have vesicles which contain air, and are supposed to be destined to assist in supporting the plant.

53. LAMINARIA. Lamour.


Hab. In the sea in deep water. Frith of Forth. Seafield rocks on the coast of Fife. 7. Summer.

Root a few thick grappling fibres. Stipes short, pinnate; pinna filiform at their origin from the stem, but speedily expanding into plane frondlets 2 or 3 inches long. The main frond arises immediately above them, and is from 2-12 feet long or more, and 2-7 inches broad, entire at the margin. Fructification contained in the pinnae, a portion of which is more fleshy than the rest.—Plant eaten in Scotland, and called Badderlocks.


β, bullata, frond rugose and bullate in the centre, Turn. Fucus saccharinus. Smith, E. B. t. 1376.

γ, acuminata, frond oblong, thin, and almost membranaceous, acuminate, Turn.


ε, latissimus, stipes very short; frond broad, roundish-ovate or elliptical. Turn. L. latifolia, Ag. Sp. Alg. p. 119.

Hab. Sea-shores, mostly in deep water. β, and γ are common in the Frith of Forth. δ, is plentiful only on the Seafield rocks on the Fife coast at low tides. ε, occurs rarely, and chiefly in rejectaments. Perennial.

Plant mostly of an olive-green colour; varying prodigiously in size and form. Stipes 1 inch to above 2 feet long, and from the eighth of an inch
to three quarters of an inch thick, firm, and sometimes almost woody.

Frond 1-12 feet long and 2-12 inches broad, according to the variety. The highly undulated margin occurs occasionally on all the varieties, as also does the bulbed appearance, and sometimes both together. Var. 5, I think it best to consider a variety at present; but I have been much perplexed with specimens I have recently gathered, near 2 feet long, retaining the peculiar character of the smaller ones.—Broad fronds of L. saccharina are liable to become lacerated, and then resemble the following.

3. L. digitata, root composed of thick grappling fibres; stipes cylindrical, woody, expanded at its apex into a large, roundish, plane frond, deeply cleft into ensiform segments. Lamour.


Hab. Sea-coasts, in deep water; perennial. Very common.

Plant of a dark olive-green colour; covering large spaces, and the summits only visible at the lowest tides. Stipes 3-6 feet long or more, often an inch in diameter, very stout and strong, attaching itself to the bottom most firmly by its thick, cartilaginous roots. Frond 1-5 feet long or more, 1-3 feet broad, very strong and cartilaginous, entire at the external margin, but cleft deeply into a number of mostly simple segments. Fructification, granules immersed in the substance of the frond.—In this species, as well as in the preceding, there is sometimes a contraction near the base of the frond, which is represented in Mr Turner’s plate of L. saccharina. This circumstance, in some specimens, is evidently a new frond displacing the old one, which at length falls off. Thus, I have found specimens of L. digitata with an old and a new frond of equal size, attached to each other by a narrow neck; the old one cleft to the base dark and coriaceous, the new one entire, or just beginning to split, but the segments still cohering at the base of the old one; the texture thin, and of a much lighter color.

54. FUCUS. Linn.


2. spiralis, frond twisted in a spiral manner; vesicles none; receptacles roundish. Fuc. spiralis, Linn. Smith, E. B. t. 1685.

γ. acutus, frond narrow, producing vesicles; the apices long, lanceolate. Fuc. spiralis, Esp.

δ. longifructus, frond mostly without vesicles; receptacles linear-lanceolate. Fuc. longifructus, DC. Fl. Franc.


ξ. multifidus, frond broad, producing vesicles; receptacles long, variously divided.
Hab. Sea-shores, frequent. All the above varieties grow in the Frith of Forth. § Only occasionally. ¶ Opposite to Seaford Baths. ¶ Spring and summer.

Plant 3 inches to 3 feet long or more. Root a callous disk. Frond flat, dark olive-green, frond of an inch to 1 inch broad, dichotomously branched. Receptacles of fructification terminal, single or in pairs, turgid, under the surface perforated; the perforations are the tuberces which contain the sporules. The different appearances of this species will be perceived by the characters of the varieties.—A useful plant in the manufacture of kelp.


Hab. Sea-shores. Frith of Forth near Cramond, Maughan.

Plant olive green, a foot long or more. Root a small callous disk. Frond 3 or 4 lines broad, flat, entire. The lateral ones much narrower, fastigate, and terminating in a number of linear, narrow receptacles, having pores, with tuberces beneath, as in the preceding species.


Hab. Rocky sea-shores. Frith of Forth, very plentiful. ¶.

Plant 2-7 inches long, of a yellowish olive-green colour. Root a callous disk. Frond linear, rarely 2 lines broad, canaliculate, dichotomously branched. Receptacles of the fructification terminal, having pores communicating with immersed tuberces containing sporules.


Plant olive-green, 2-5 feet long. Root a callous disk. Frond compressed, thick and coriaceous, about 3 lines broad, ribless, branched repeatedly in a distichous manner. Receptacles of fructification turgid, numerous, distichous, deep orange-yellow.


Plant 1-4 feet long, dark-olive green. Root a callous disk. Frond nearly an inch broad, branched in a dichotomous manner, the surface dotted with perforations, out of which issue minute tufts of white fibres. Receptacle appearing like a continuation of the frond and serrate, but thicker,
and of an orange colour when mature, containing tubercles, which emit their sporules by a pore.

55. HIMANTHALIA. Lyngb.

1. H. lorea.

Hab. Rocky sea-shores. Frith of Forth, Dr Richardson. Occasionally on the Edinburgh coast among rejectamenta, but not growing (to my knowledge), nearer than Dunbar. ✂. Summer.

Plant of a dark olive-green colour, 2-6 feet long. Root a small callous disk, from which arises a short stipes scarcely an inch long, which dilates into a cup-shaped, gelatinous, (at length coriaceous), disk, an inch broad or more, from whose centre one or two fronds arise. Frond narrow at its origin, but soon becoming 3 or 4 lines wide, and nearly equal to the extremity; compressed, thick, coriaceous, repeatedly branched in a dichotomous manner, and has been aptly compared to a leather thong. The whole frond may be considered as an elongated receptacle, for the tubercles are contained in its whole extent, and discharge their sporules by pores on the surface.—Scarcely distinct as a genus from Fucus.

56. CYSTOSEIRA. Agardh.


Plant of a dark olive-brown colour, 1-4 feet long or more. Root a callous disk. Stipes much branched, in a distichous manner, flexuose, linear, 1-2 lines broad, compressed, between coriaceous and cartilaginous. Leaves chiefly present in young plants, distichous, 1-2 inches long, acute, about a line broad. Receptacles towards the summit of the branches, nearly an inch long, and above a line in diameter, dotted with minute pores connected with immersed tubercles. Vesicles distichous on the stem and branches, an inch long, pod-like, beaked.


Hab. Sea-shores. Frith of Forth, extremely rare. About Leith and Newhaven, Mr Yalden. (It has never been found since the time of Lightfoot.) ½. June—October.

Plant of an olive-green or brownish colour, 12-18 inches long. Root a callous disk. Stipes 3-6 inches long, simple or divided, stout, and beset with
oblong knobs, from the apex of each of which springs a branch. Branches slender, filiform, numerous, repeatedly divided, axils of the divisions rounded, bearing very small leaves, or rather spines, towards the extremities. Receptacles very narrow, terminal.—Excessively liable to vary in appearance.

57. LICHINA. Agardh.


Hab. Marine rocks. Coast of Fife. Ƃ. Summer.

Plant of a green black colour, somewhat gelatinous when moist, very brittle and hard when dry, 3–4 lines high, growing in patches. Frond plane, thickish, branched, scarcely one-third of a line broad, the branches spreading. Tubercles minute, towards the summits of the branches.


Hab. Marine rocks. Frith of Forth, at Caroline Park and elsewhere. Ƃ.

Plant of the same appearance as the preceding, but much less, being scarcely more than a line high. This may be only a variety of the last. Both strongly resemble lichens, and were it not for their situation, might be with propriety referred to that Order.

58. FURCELLARIA. Lamour.

1. F. lumbricalis.


β. fastigiata, apices compressed, transparent, ovate-lanceolate, short, acute, Turn.

Hab. In small pools among marine rocks. Frith of Forth, frequently; β. occasionally. Ƃ. Autumn to spring.

Plant dark olive or reddish, 3–9 inches long. Root a number of thickish cylindrical fibres, matted together. Fronds cylindrical, about a crow-quill in thickness, branched repeatedly in a dichotomous manner, the angles very acute. Fructification residing in the extremities of the branches, which are swollen for the space of an inch to twice the usual diameter. There are no pores on the surface, but a row of sporules are contained within the circumference. The fructifying portion of the branches, and the pale enlarged summits of var. β, after a certain period, fall off, and leave the branches completely truncate.

59. SPONGIOCARPUS. Grev.

1. S. rotundus.


Hab. Sea-shores, in small pools among the rocks. Frith of Forth, very rare. Caroline Park, Mr E. Maugham. Near Kirkcaldy, Mr Stewart.
Plant 3–6 inches long, of a dark olivaceous, or reddish colour. Root a small callous disk. Frond as thick as a crow’s quill, branched several times in an irregularly dichotomous manner, the summits rather acute, and subequal in height. Fructification in the form of naked, spongy, wart-like masses on the sides of the upper branches, fully a line in diameter, and often 2 or 3 lines in length, and of a pale pinkish colour. These masses, when examined, are found to consist of minute, diverging jointed filaments, among which the sporules are disposed.—This plant, when not in fructification, is with difficulty at first distinguished from Purcellaria lumbricalis. The root, however, of the latter is fibrous, and the dichotomies of the branches acute; that of the other solid, and the dichotomies far less acute. I know of no plant whose fructification resembles that of the present one.

60. SPOROCHNUS. Agardh.


Plant 2–3 feet long, much branched in a distichous manner, olive-green. Root a callous disk. Stipes cylindrical only at the base. Branches very narrow, linear, when young furnished with little feathery, marginal, equidistant, deciduous tufts of jointed filaments of a yellow-green colour. These are succeeded by little, acute, erecto-patent spines.


Plant 1–2 feet long or more, of a deep rich orange colour, when growing, according to most authors; but in hundreds of plants I have seen growing in the Frith of Forth, they were all brownish olive-green; soon after gathering, it changes to a verdigris green, and decomposes the plants with which it is in contact. Root a callous disk. Frond extremely divided, and very fine and conflerva-like. Fructification I conceive to be still unknown, unless Lyngbye is correct in describing hemispherical tubercles, which I have often thought to detect, but found myself deceived.


Plant 2–5 feet long, brownish-olive, but changing to orange and to bright green when gathered, and decomposing other algae next it, like the preceding. Root a plane callous disk. Frond 1–2 lines broad, much branched and bipinnate, the branchlets fringed with little tufts of delicate filaments, which are very fugitive. Substance between membranaceous and cartilaginous.

61. Scytosiphon. Agardh.


Hab. Sea-shores, in deep water. Frith of Forth, frequent, especially on the coast of Fife. ©. Summer.

Plant dark brown olive, 1–20 feet long. Root a callous disk. Fronds 1–3, very slender at first, but gradually attaining the thickness of near 2 lines, and again tapering at the end. Substance cartilaginous, having a spiral arrangement, which may be shown by dissection. Fructification, pyriform bodies covering the surface.—Sometimes found covered with confervaceous filaments, which, according to Agardh, denote the barren state of the plant.


Plant 1–3 feet long, of a rather pale olive green colour. Root a minute callous disk. Frond with an erect stipes, not thicker than the branches which it gives out even from the very base. Branches scarcely thicker than a sparrow’s quill, long, and generally simple to the summit. The summit of the stipes also passes into similar branches, which are erect. Fructification contained among the diverging filaments, of which the substance of the plant is composed.
Div. II. Florideæ. Plants of a purplish, reddish, or fine rose-colour, sometimes tinged with green, becoming more brilliant on exposure to the air. Texture various. Frond expanded, compressed or cylindrical. Fructification often double, both tubercles containing sporules, and naked granules scattered and immersed in the substance of the frond. When both kinds occur in the same species, it is on separate individuals.—Root a small callous disk. Plants all marine.

63. Gigartina. Lamour.


Hab. In the sea, generally attached to the stems of Laminaria digitata, in deep water. Seashield rocks on the Fife coast. ¥. Summer.
Plant 3–12 inches long, purplish brown. Root a small callous disk. Frond slender, cylindrical, simple or divided from near the base into a few main stems, densely clothed with almost bristly ramuli, 3–5 lines in length; to these are added in the summer, elongated branches, very fine and conferva-like in appearance, much divided, and half an inch to near two inches in length. Fructification naked sporules in the swollen extremities of the ramuli, or globular tubercles on the finely divided summer branches.


Hab. In the sea. Frith of Forth, common, on rocks and stems of large Algae. ¥. Spring and summer.
Plant conferva-like in habit, 3–8 inches long, of a reddish or purplish colour. Root a minute callous disk. Fronds very slender, aggregate, extremely branched. Principal branches erecto-patent, alternate, somewhat pinnate with others, which are again divided, the ultimate ones often tufted with most delicate fibres. Fructification innate tubercles arranged at the swollen ends of the branches, in a single or double series; or ovate, solitary, or clustered receptacles, containing a few pyriform sporules.—It becomes blackish in drying.

3. G. plicata, frond horny, filiform, of equal size throughout, irregularly branched and entangled, extremities of the

Hab. Sea-shores, among rocks, frequent. Frith of Firth, chiefly on the Fife Coast. 4. Autumn to spring.

Plant of a horne, rigid substance, the branches wiry and entangled, 3–9 inches long. Root a minute callous disk. Frond thicker than a stout hog's bristle, equal: the branches often fastigate, spreading, sometimes secund. The colour is a dark brown red or purple, sometimes pale and pinkish, and often by long exposure to the air yellowish white.


Hab. Sea-shores. Rocks between Newhaven and Caroline Park and elsewhere, in the Frith of Firth, plentiful. ◎ Summer.

Plant 1–2 feet long, of a pale brownish purple, diaphanous, becoming tinged with green in decay. Root a few short thick fibres, the centre disk-like. Frond much branched, the stem about as thick as a crow's quill, nearly equal throughout its whole length. Branches attenuated at their base. Tubercles innate, crimson, mostly solitary, but several in the same branch.

64. CHONDRIA. Agardh.


Hab. Sea-shores. Frith of Firth, plentiful. Summer. ◎

Root a minute disk. Frond attenuated at the base, 3–9 inches long, between a crow-quill and goose-quill in thickness, several from the same base, cylindrical, branched in a variable manner; branches mostly simple. Substance gelatinous within, but in drying the mere skin appears only to be left. Colour usually more or less purplish, turning in decay to pale greenish or whitish.

Chondria. Cryptogamia. Algae. 291

Hab. Sea-shores, on other algae. Rare in the Frith of Forth. Messrs J. Stewart and Greville. O. Summer.

Plant 3-6 inches long, of a yellowish pink colour, and gelatinous substance when young, but at length cartilaginous. Root a minute callous disk, along with a few thick fibres. Frond branched from the base, bi-quadrinipple; the lower branches the longest; the ultimate divisions very short, obtuse, somewhat clustered. Sporules of the tubercles pyriform; those immersed in the frond, orbicular.


β. osmunda, frond flat, generally undivided; ramuli short and multifid.


Pepper-dulse.—Frond 1-7 inches long, of a reddish, purplish, pinkish or brownish colour, changing in decay to a greenish white or yellow. Root a callous disk, accompanied by a few creeping fibres. Several fronds arise from the same root, and are more or less regularly bipinnate, the pinnae spreading. Substance cartilaginous, subdiaphanous.—Eaten in Scotland; has a pungent flavour.


Hab. Sea-shores. Frith of Forth; on the Leith sands, Dr Richardson. About Caroline Park. July, August. O.

Plant of a pale pinkish red colour, and so gelatinous as not to require pressure to preserve it. Root a minute disk. Frond 6-12 inches long, solitary, tubular, much branched, not contracted, or with any appearance of joints; branches rarely opposite.


Hab. Rocks in the sea, and on the larger algae. Frith of Forth, frequent. Summer. O.

Root partly a disk, and partly creeping fibres. Fronds 2-9 inches long, numerous, as thick as a crow's quill, many times dichotomous, and whorled with smaller branches of equal length; the whole regularly contracted in a moniform manner, but not absolutely jointed. Colour reddish pink or purplish. Substance somewhat gelatinous, transparent.

Hab. Marine rocks. Musselburgh, Lightfoot. Caroline Park coast, and on the coast of Fife in various places.nero. Spring to autumn. Root creeping, fibrous. Fronds filiform, very numerous, matted together, half an inch to 1 inch long, spreading widely over the rocks; somewhat compressed, contracted or obsoletely jointed. Tubercles (the fructification?) very minute, wart-like, black. Colour of the frond pale purplish. Substance soft and tender, subdiaphanous.


Hab. Marine rocks. Rocks by Caroline Park, Dr Richardson, 1819. (This is the station given by me in Dr Hooker’s Flora Sotland, but I did not then know that my friend Dr Richardson had found it). ny. Summer. Root creeping, fibrous. Fronds numerous, much entangled and matted, spreading over the rocks in the manner of the preceding species; scarcely an inch long, much branched, almost flat, varying much in thickness, some being quite capillary. Colour purplish or reddish-pink. Substance somewhat horny, especially when dry, subdiaphanous.

65. DELESSERIA, Lamour.

* Fronds ribbed or veined.


Hab. Sea-shores. Frith of Forth, not unfrequent. January—May. 3. Root a callous disk. Fronds several, arising from a cylindrical stipes about half an inch long, of a splendid and delicate pink colour, 3-8 inches in length, with a strong midrib, and numerous parallel dark nerves arising from it. Substance extremely thin and membranaceous; that of the stipes cartilaginous. The pedunculated tubercles are produced on the midrib in the second year, when little or none of the delicate part of the frond remains.

DELESSERIA. CRYPTOGRAMIA. ALGÆ. 293

HAB. Sea-shores, mostly attached to the stipes of larger algae. Frith of Forth, plentifully. January—August.♀.

Root a small disk. Fronds varying prodigiously in form, especially in breadth; barren plants in summer sometimes measuring 8 inches, but fertile ones often not one inch. They are 3-12 inches long, and are best known by the sinuate margin. Colour a fine pink, the midrib and veins darker. Substance membranaceous.


Root a small disk. Fronds many from the same base, 3-9 inches long, spreading, much divided, linear, but varying in breadth from half a line to 3 lines. Colour deep rose. Substance membranaceous. Spherical tubercles in the substance of the midrib of the branches, or in small leafy processes arising from the midrib.

4. D. hypoglossum, frond branched, winged; branches (or leaves) arising from the midrib, linear-lanceolate, entire, reticulated; sporules either naked towards the apex of the leaves, or in spherical tubercles on the midrib. Fucus hypoglossum, Turn. Hist. Fuc. t. 14. Smith, E. B. t. 1396.


Root a minute disk. Fronds several from the same base, 2-4 inches long, 1-2 lines broad, flat, beautiful rose colour, branched in a proliferous manner from the midrib; apices of the branches acute. Substance membranaceous, reticulated, transparent.—A fine addition to the Edinburgh Flora, for which I am indebted to the zeal of the Arctic traveller Dr Richardson.


Root, a small disk. Fronds thin, membranaceous, single or several from the same base, 3-7 inches long, branched, branches linear, subdichotomous, ¾-¾ an inch broad, the margins entire or waved. There is no midrib, but several subparallel veins, which are most conspicuous towards the base. Colour transparent, pale or deep red.

** Frond veinless.

6. D. laciniata, frond stoutly membranaceous, flat, nerveless, branched; branches dilated upwards, and variously divided; sporules either naked and scattered continuously along the margin, or in tubercles contained in leafy marginal processes. Sphæ-
Sphærococcus, Agardh.


γ, stellatus, frond submembranaceous; branches dilated upwards, divided at their apices into very numerous, clustered, shortish laciniae. *Turn.*
3, **equalis**, frond cartilaginous, thick, all the branches equal and linear, the extreme segments obtuse. *Turn*. **Fucus crispus**, Smith, E. B. t. 2235.

3, **Sarniensis**, frond between coriaceous and cartilaginous; branches slightly channelled on one side, dilated upwards, the apices rounded and emarginate. *Turn*.

**Hab.** Sea shores. Frith of Forth, plentiful. 9. September—May.

**Root** a callous disk. *Fronds* 1–5 inches long, several from the same base. **Colour** a deep glossy reddish or brownish purple. **Substance** when dry almost horny.—A very variable plant.


**Hab.** Sea-shores. Frith of Forth, plentiful. 9. The whole year.

The habit of this plant is so like that of the preceding, that it is unnecessary to add any thing additional, the specific character containing all the difference between them. They are truly distinct, but the fruit is the only mark for a student to confide in. The varieties are as numerous also as in the preceding, and generally preserve a mutual similarity with *Sp. crispus*, in the same locality.


**Root** a callous disk. *Fronds* numerous from the same base, 2–6 inches long, reddish purple, somewhat transparent. **Stipes** half an inch to near two inches before expanding into the leaf.—Subject to much variation, but not so much so as the two last species.


**Root** a callous disk. **Stipes** one to several from the same base, 1–2 or more inches before expanding into the flat frond, which is of a deep purplish red colour, and dilated towards the apex, from whence spring other fronds in a proliferous manner, cylindrical at their origin, but becoming immediately plane.—Var. **concatenatus** of Lyngbye is a curious, elongated, en-
tangled, and highly proliferous plant, specimens of which have been kindly communicated to me by Professor Hornemann.


Root a small disk. Fronds purplish red, 3–6 inches long, a good deal divided dichotomously; branches 2-4 lines broad, often somewhat crisped. Besides the tubercles there are generally minute clusters of peltate leaves. Substance rigidly membranaceous.


Root a small disk. Fronds 1–2 inches long; branches scarcely a line broad, numerous, entire at the margin. Colour beautiful pink scarlet. Substance tender, membranaceous when dry. The tubercles occur both at the sides of the branches and at their extremities.—Var. β. Turn., found by Hooker in Scotland, I believe to be a distinct species.


Root partly a disk, and partly fibrous. Fronds very numerous, 2–6 inches long, ribless, compressed, once to thrice pinate, but in some varieties irregularly branched. Branches generally scarcely half a line wide, sometimes quite setaceous or capillary. Colour deep pink, reddish or purplish. Substance peculiarly corneous, and somewhat wiry.—Very liable to vary in its general character.

67. ODONTHALIA. Lyngb.

1. O. dentata.


Hab. Sea-shores, on submarine rocks. Frith of Forth, plentifully, Lightfoot. It is most abundant, growing between Burntisland and Starleyburn. ? Feb.—July.
Root a conical disk. Fronds one or several from the same base, 3-9 inches long, much branched; branches flat, membranaceous, absolutely ribbed, pinnate with short, alternate, tooth-like, erecto-patent branchlets or processes, which are sharply dentate at their apex; the branches, including the pinnæ, about four or five lines broad. Fructification of two kinds, axillary clusters of pedunculate, urceolate capsules, containing pyriform sporules, and solitary minute pods resembling ciliae, at the margin of the frond, containing a single or double row of roundish sporules. Colour very deep brownish red, except in the youngest shoots, which are pink.

68. PTILOTA. Agardh.

β. capillaris, frond flaccid, very narrow, nearly cylindrical, jointed. Turn.


Root a small disk. Frond 3-9 inches long, branched, compressed, half a line to a line broad; branches repeatedly, closely and beautifully pinnate; the pinnæ horizontal, opposite, giving a complete feathery appearance to the plant. Colour deep purplish red. The ends of the ramuli divide into a regular involucre, to inclose the naked seeds. Var. β. has a capillary frond, and a confervoid habit, the younger branches resembling Conferva plumula; it is regularly jointed, more branched, and never infested with fustrea and sertularia, as a. is almost invariably. The fructification hitherto has been found unaccompanied by an involucre. Is it not distinct?

DIV. III. ULVIOIDEA. Frond either expanded or tubular and continuous; simple or branched, of a membranaceous, subcoriaceous, or somewhat gelatinous substance. Colour mostly green or purplish, sometimes reddish or dark brown. Fructification naked sporules immersed in the frond (often in groups), or imbedded in a central gelatinous mass. Structure mostly a simple reticulation. Some are minute; and a few belong to fresh water and moist rocks.

69. ZONARIA. Draparn.


Hab. In the sea, on rocks and various marine plants. Black Rocks Leith, and about Newhaven, Lightfoot. Aberdour. 0. Summer.

Plant 2-6 inches long, thin, a good deal branched, the branches always
dichotomous and linear, but varying in breadth from 1 to above 2 lines.

Lines of fructification interrupted.


*Hab.* Marine rocks, rare. Frith of Forth; a single specimen in rejectamenta near Portobello. (? Autumn.

Plant 2-6 inches long, and 2-5 inches broad, of an olive green when young, at length brown and less membranaceous. *Root* a downy disk. *Frond* almost filiform at the base, but becoming immediately dilated, and cleft half way down into linear obtuse segments.

70. ULVA. Linn.

* Frond more or less coriaceous, purplish red.


*Hab.* Basins of marine rocks. Frith of Forth, not unfrequent. Leith, Sir J. E. Smith. At low tides among the large stones between Newhaven and Caroline Park. (?) Autumn.

True Dulse.—Plant of a very dark red colour, and strong texture, 4–12 inches long, 2-6 inches broad. *Root* a callous disk. *Stipes* very short, dilating immediately into an oblong-obovate frond, much rounded at the apex. *Fructification* naked sporules scattered throughout the frond in small irregular clusters.


*Hab.* In the sea, on rocks and marine plants. Frith of Forth, very abundant. (?) Oct.—April.

Common Dulse.—Plant 3–12 inches long, of a much thinner substance than the preceding, and of a more transparent and diluted colour. *Root* a callous disk. *Fronds* at first subcylindrical, but immediately expanding; mostly palmate, but sometimes simple and linear oblong, and half an inch to an inch broad; the segments of the palmate ones have the same character; apex somewhat attenuated. *Fructification* large, irregular spots of naked sporules.—This and the preceding are eaten in Scotland under the common name of Dulse.

** Frond membranaceous.

**ULVA. CRYPTOGRAMIA. ALGÆ.** 299


**Hab.** Marine rocks. Frith of Forth, very frequent. **β.** In various places, as Caroline Park, &c., Messrs Richardson and Greville. □. Aug.—November.

**Laver.—** Plant a mere membrane, very flaccid, in drying becoming crisp and beautifully transparent. *Root* a minute callous disk. *Frond* 4-14 inches broad, with a rather ragged irregular margin, longitudinally plicate. **Var. β.** varies in no respect except in form, and I have seen every intermediate state. **Fruitication** according to the figure in *E. B.*, irregular clusters of very minute sporules.—Variously prepared as food.


**Hab.** In the sea. Frith of Forth, plentifully, in rocky basins. Summer and autumn. □.

**Green Laver.—** Plants generally very numerous, 2-12 inches long; 2-8 inches broad, of a delicate and tender substance, very thin and membranaceous, uniform bright green. **Sporules** very minute, scattered over the whole frond.—This is eaten at table in England, being stewed with lemon-juice.


**Hab.** Rocks and stones in the sea. Seafield Baths, Dr Richardson. Between Newhaven and Caroline Park. Summer. □.

**Frond** 6-20 inches long, about an inch broad, very thin, transparent, beautifully waved at the margin, attenuated at the base into a short stipes.


**Hab.** Marine rocks. Frith of Forth, at Caroline Park, and on the Fife-shire coast, but not common. Spring and summer. □.

**Fronds** 3-9 inches long, from one-eighth of an inch to one inch broad, of a firm membranaceous texture, obtuse at the apex, but attenuated below into a very narrow cartilaginous base. **Sporules** very minute, irreguarly scattered over the frond.


**Hab.** On the ground in moist shady places, and on thatched roofs, frequent.

**Fronds** inflated, much curled and crisped, lying partly over each other, of a very thin texture, and forming a broad mass on the places where they grow. They vary from half an inch to above an inch in diameter.
71. FISTULARIA. *Grev.*


**Hab.** Ditches containing salt or brackish water, generally floating on the surface. About the coast, in summer. 

**Root** very minute, scutate. **Fronds** 1–2 feet long, quite simple, erect as long as they are attached to the rocks, filiform at first, but soon becoming thick and inflated, rugose, of a yellow green colour, and thin and flaccid substance.


**Hab.** In the sea. Frith of Forth, abundantly. 

**Frond** variable, 6–18 inches long, sometimes as fine as a conferva, at others dilated upwards, and towards the apex an inch broad; quite simple or much branched, decumbent. **Substance** tender, soon lacerated; the surface is either even or wrinkled. Some varieties are contracted at irregular intervals. **Sporules** collected into small groups, in the substance of the frond.

3. *F. erecta,* frond green, tubular, filiform, conferva-like, much branched; branches and branchlets numerous, alternate, the central one erect, resembling a stipes. *Scytosiphon erectus,* Lyngb. p. 60. t. 15. *Conferva paradoxa,* Smith, E. B. t. 2328.?

**Hab.** In the sea. Frith of Forth, near Burntisland, in rocky basins. 

**Frond** arising from a minute scutate base, very slender and filiform, 3–8 inches long, much divided and subdivided, bright green, becoming paler and slightly glossy when dry. **Branches** weak, the lower ones the longest; the central one is erect, dividing about half way up into branches, exactly as in *Chordaria flageliformis.* **Substance** tender. It appears cylindrical under the microscope, and reticulated, but I have not seen the sporules, nor has Lyngbye described them.


**Hab.** In the sea, attached to rocks, stones, shells, &c. Frith of Forth, near Pettycur and Kirkaldy. 

**Fronds** gregarious, 6–12 inches long, perfectly simple, arising from a scutate base, very slender, dilating gradually to the diameter of 2–3 lines, attenuated towards the apex, continuous, or contracted, as if jointed. I have never seen the fructification.

72. NODULARIA. *Link.*

1. *N. fluviatilis,* filaments almost simple, swelling into joint-

Hab. In streams, in the Highlands and Lowlands. Craighall, Mr Yalden. Water of Leith, and in the stream which flows past Braid Hermitage; and elsewhere. Summer.

Filaments as thick as a hog's bristle, growing in lax tufts, 2-9 inches in length, of a very dark dull green colour; they are quite simple or slightly branched, arising from a small scutate base, and much attenuated towards the apex. Within they are continuous, and contain moniliform, branched filaments and oval sporules in the knots, as well as the rest of the filaments, according to Lyngbye. Substance coriaceous; brittle when dry.

73. GLOIONEMA. Agardh.


Plant of an olive or brownish green, growing in conferva-like tufts, 1-2 inches long, the filaments much entangled, very flacid, membranaceous, somewhat tenacious, pellucid. Granules longitudinally arranged, becoming swollen in age, according to Lyngbye, and each marked with 4 dots. The plant has a somewhat putrid, animal odour.


Filaments about three-fourths of an inch high, growing erect in the water, and forming small, lax tufts, of a yellowish or olive green colour. A gelatinous pellucid mass fills the interior, throughout which the numerous granules are arranged.

3. Gl. dichotomum, filaments slender, erect, dichotomous; branches rather remote, swollen here and there into roundish knobs; interior gelatinous, with numerous cylindrical oblong granules.


Filaments about an inch high, growing in small, lax, erect tufts; branched dichotomously, and curiously dilated here and there. Colour yellowish green. Substance membranaceous, tenacious, pellucid.

74. BANGIA. Lyngb.

1. B. fusco-purpurea, filaments reddish or purplish, continu-

**Hab.** On rocks and wood-work in the sea. Burntisland Pier, Mr Walker Arnott. Summer.

Filaments simple, forming fine silky tufts, 1–3 inches long; finer than a human hair, elastic, of a fine red purple colour, equal when young, but in age swelling here and there. Sporules globose, densely arranged in oblong squares, placed transversely.


**Hab.** On the frond of *Laminaria esculenta*. Frith of Forth, Mr Walker Arnott. Near Burntisland, on *Olea planifolia*.

Tufts minute, 1–2 lines long, of an olive green colour. Filaments several from the same base, crowded, very fine. Sporules globose.


**Hab.** Moist rocks and stones on the mountains. Pentland Hills, Messrs Arnott and Greville.

Tufts broad, of a greenish black colour. Filaments decumbent, much entangled, from a quarter of an inch to one inch long, much branched; rami somewhat attenuated, and often subsecund. Colour under the microscope olivaceous-yellow or brownish.

75. *SCYTONEMA*. *Agardh.*


**Hab.** Rocks moistened with the spray of rivulets. Near Burntisland, Fifeshire.

Plant covering the precipitous faces of moist rocks, much branched, rigid; ultimate branches obtuse, two often arising together, and of equal length, but this mode of growth is not constant. Interior appears filled with a row of beads.—I have also gathered it in the Pass of Leny.


Tufts an inch broad or more, blackish. Filaments 1–4 lines long, decumbent, the apex erect, where they are most branched; branches often cur-
3. Sc. Bangii, filaments simple, erect, flexuose, spirally twisted into pointed masses, greenish above, brownish below; within often moniliform. Lyngb. p. 98. t. 28.


Filaments growing in compact tufts, 1-2 inches high, of a dull, but somewhat aeruginous green, more or less tortuose, and as it were adglutinated. Under the microscope they are found to be either hyaline or bead-ed within, of a somewhat rigid nature, and greyish, or tinged with bluish green.

76. OSCILLATORIA. Vauch.

* Growing in fresh water.

† Filaments lying in a slippery stratum.

1. O. limosa, filaments simple, blue-green, lying in a blackish green stratum, compact, throwing out long straight rigid filaments on every side. Lyngb. p. 86. Ag. Syn. p. 104. (not of Hook.) Conf. fontinalis, Dillw. t. 64. (but surely neither C. limosa nor fontinalis of E. B.)?

HAB. Slow streams, ditches and ponds, floating in masses on the surface of the water. About Edinburgh, common. Plants floating in very dark green masses, its filaments radiating from the edges: if placed in a plate of water, it will shoot out in the course of a single night filaments 3 inches long; and, under favourable circumstances, may be seen to enter the field of a high power of the microscope, and pass out at the opposite side. Transverse striae crowded, very distinct.


HAB. In wells, small pools and slow streams. At St Bernard's Well. Spring. Stratum spreading, dense, slippery, throwing out short, radiating, very slender filaments, 2-6 lines in length, obtuse, of a pale green colour, sometimes tinged with olive. Striae difficult to perceive, in which, as well as in the much slenderer filaments, it differs strikingly from the preceding.


HAB. On rocks and stones in subalpine rivulets. Pentland Hills. Spring. Plant spreading, and forming a broad stratum, very compact, thin, brown, scarcely radiating. Filaments crowded, entangled, exceedingly slender, almost hyaline, the transverse striae inconspicuous from their fineness.

\textbf{Hab.} In pools and boggy places, frequent. About Edinburgh.

\textit{Plant} very conspicuous from its large ochrey gelatinous masses, which are so fragile that Dillwyn observes, any agitation of the water breaks them into a thousand pieces. Filaments curved, exceedingly slender, so that transverse striae are perceived with difficulty.

†† Filaments destitute of a slippery stratum.

5. O. splendida, filaments exceedingly minute, densely entangled, of a splendid deep aeruginous green colour; transverse striae wholly invisible, from the minuteness of the filaments.

\textbf{Hab.} In tubs of water in the stove of the Botanic Garden.

\textit{Plant} floating on the surface, and attached to the plants among which it grows, forming thin masses of 1-3 inches diameter. Filaments under the highest power of the microscope, appearing not larger than a human hair, and of a very pale bluish colour.—It has the colour and external character of \textit{Oscill. major}, but cannot be confounded with it when magnified.

** Marine.


\textbf{Hab.} Marine rocks. Frith of Forth, Messrs Arnott and Greville. Summer.

\textit{Tufts} very dense and broad, dark green. Filaments 1-3 lines long, fine as a human hair, with very numerous, dark transverse striae, some of which are broader than the rest.

*** Subterrestrial, (growing on the ground, damp walls, or wood).


\textbf{Hab.} On damp walls, walls, stones, &c. Very common at all seasons.

Filaments entangled, and interwoven into broad thin masses, of a fine full green colour; obtuse, and furnished with tolerably evident transverse striae, closely arranged.


\textbf{Hab.} Damp wood, as old pumps and aqueducts. Also on walls. About St Bernard's Well. March.

\textit{Plant} "growing in large glaucous patches, so intimately woven as to peel off in flakes, bearing a considerable resemblance to a piece of silk or ribbon," (Dillw.). The filaments are much finer than in the preceding, and the transverse striae not so visible. Dillwyn says they are about equal in length to the thickness of the filaments.

**Hab.** On the ground, and on damp walls in the autumn. Common in the old part of Edinburgh.

Plants widely spreading, lubricous, densely interwoven, and often mixed with O. murialis. Filaments half the diameter of that species, shortly radiating, the transverse striae nearly as distant as the diameter of the filament, and not very perceptible.

**77. VAGINARIA.** Gray.

1. V. chthonoplastes.


**Hab.** Damp walks, moist garden-pots, also in streams, according to Dillwyn, and in the sea, according to Lyngbye. Occasionally about Edinburgh, on the ground.

General filaments simple, or divided, dark green, slippery, gelatinous, decumbent, interwoven, penetrating the ground or sand on which they grow. These general filaments include within their gelatinous pellicular sheaths a number of very slender ones, which are parallel, simple, of a green colour, sometimes dividing into spirally twisted bundles; passing out at the apex, and then becoming radiated; sometimes they find their way out at the side, and immediately elongate and radiate, having an oscillating motion like the Oscillatoria, to which this wonderful plant is nearly allied. I have not been able to observe striae or disseipments.

**DIV. IV. VAUCHERIDEE.** Plants tubular, capillary or filiform, continuous, membranaceous, branched, of a green colour. Fructification either very minute sporulcs, dispersed in an internal green mass, or external, viviparious (?) vesicles of the same nature as the frond.—Marine, fresh-water, and terrestrial plants.

**78. VAUCHERIA.** De Cand.

* Vesicles solitary.


**Hab.** Ditches and stagnant water. About Edinburgh. Summer.

The most robust of the genus, growing in large entangled tufts, of a very dark green or blackish colour. Filaments a foot long or more, erect or ascending, divided chiefly towards the summit into a few dichotomous branches. Vesicles visible even to the naked eye.

CRYPTOGAMIA. ALGÆ. VAUCHERIA.

**HAB.** Shady moist places on the ground; ditch-banks, &c. very common; the whole year.

**Plants** of a dark, full green colour, and spreading like a thin, dense mat over the ground. **Filaments** decumbent, scarcely more than 1 inch long, irregularly branched, obtuse. **Vesicles** roundish, either sessile or on short peduncles, scattered.


**HAB.** Moist places on the ground. Damp walks in Dicksons' Nurseries, **Leith Walk. Autumn.**

**Plant** of a glaucous green colour, growing in a crowded manner on the ground. **Vesicles** filled with fluid, about the size of a mustard seed, striking a few filamentous roots into the ground; but I have not succeeded in finding any thing like the filaments of other Vaucheria. **Substance** membranaceous, very fragile, crackling under the feet. In age and dry weather they collapse, and become cup-shaped— I have little doubt that future observations will prove this plant to be a distinct genus.

**Vesicles in pairs or clusters.**


**Plant** growing in large bushy masses at the bottom of pools and ditches, of a dull or even brownish-green colour. **Filaments** 3-9 inches long, branched, excessively fragile. **Vesicles** somewhat resembling the head of a bird, unaccompanied by any horn-like process. The filaments are sometimes dilated into vesicles; but this is occasionally the case with most Vaucheria.

5. **V. geminata**, filaments capillary, dichotomous; vesicles roundish, in pairs, on a common peduncle, and attached to opposite horn-like processes. **Ag. Syn.** p. 49. **Smith**, E. B. t. 1766.

**HAB.** In ditches, ponds, &c. not frequent. **Tub** of water in the Conservatory of the Botanic Garden. **Summer.**

**Plant** floating in large, entangled, but not very dense masses, of a full, bright green colour. **Filaments** 6-12 inches long, rather straight, not much branched, about as thick as a human hair. **Peduncle** of the fructification trifid, having vesicles on the lateral segments.


**HAB.** Ditches, ponds, &c. **Tubs** of water in the same station as the preceding. **Summer** and **autumn.**

**Plant** floating in large masses on the surface of the water, densely entangled. **Filaments** flexuose. **Vesicles** 4-6, in a pedunculated cluster.


* Lyngbye suggests the propriety of forming a new genus of the two plants I have described under this name. Mr Gray called it Ellisius,—a name which is preoccupied. Vid. Ellisia, Gen. Pl. 268.
Fronds gregarious from a minute disk, 3-7 inches long, thick and firm at the base, as well as the main branches, are rough with a kind of villosity, and jointless. Fructification solitary, ovate-acute, sessile tubercles at the base of the ramuli, and lanceolate ones containing several series of granules. It does not adhere to paper in drying.—A very beautiful plant.

81. POLYSIPHONIA*. Grev.

1. P. fastigiata, extremely tufted and fastigiate, very dark; filaments dichotomous, subequal, the articulations shorter than broad, with a dark spot in their centre. Hutchinsia fastigiata, Ag. Syn. p. 53. Hook. Fl. Scot. 2. p. 87. Conf. polymorpha, Dillw. t. 44. Smith, E. B. t. 1764.

Hab. On the larger Fuci, very copiously. Frith of Forth, wherever Fucus vesiculosus, nodosus and serratus grow. Summer.

Filaments, many from the same disk, about 2 inches long, extremely crowded and bushy, rigid, nearly level-topped, very dark red-brown, black when dry. Fructification ovate-acute tubercles, sessile on the uppermost ramuli.


Hab. Marine rocks. Frith of Forth, very common.

Plant 6-9 inches long, growing in a copious bushy manner, of a blackish-brown colour. Filaments many from the same base, somewhat rigid below, but flaccid above. Branches alternate, very slender. Joints varying in length, sometimes twice as long as they are broad; striae of the articulations numerous, in the ramuli about 3. Tubercles mostly on very short peduncles. It adheres slightly to paper.

3. P. atro-rubescens, filaments very much branched, slender; branches long, beset with very short, subulate, subfasciculate ramuli; articulations of the main branches thrice longer than their breadth, the striae several. Hutchinsia atro-rubescens, Ag. Syn. p. 58. Conf. atro-rubesc. Dillw. t. 70.


Filaments 3-8 inches long, many from the same base, very slender, of a reddish-pink colour, but becoming darker in age; main branches rather distant, elongated, bearing others, on which short, subulate, subfascicu-

* When Agardh constituted the genus Hutchinsia, in honour of the lamented Miss Hutchins of Bantry, he could not have been aware that the same name had been bestowed on a genus of Tetradynamous plants. It is rather surprising that subsequent authors have not corrected this error. It is now become absolutely necessary to do so, as that which was first created has every prospect of being continued.
Polysiphonia. Cryptogamia. Algae. 309

late ramuli, about a line long, are arranged. Tubercles ovate, on short peduncles. Substance flaccid, tender. It adheres to paper.

4. P. urceolata, deep red; filaments capillarv, very much branched, bushy; branchlets short, spreading; joints of the main branches long, those of the ramuli short; tubercles subpedunculate, urceolate. Hutchinsia urceolata, Hook. Fl. Scot. 2. p. 88. Conf. urceolata, Dillw. p. 82. t. G. Smith, E. B. t. 2365.

Hab. Marine rocks and the larger alge. Frith of Forth, opposite Caroline Park, and rocks near Seafield Tower.

Root a minute disk, from which a great number of capillary entangled filaments arise, 2-9 inches in length, equal, remotely branched below, but very profusely and in a bushy manner above. Joints marked with 2 striae. Tubercles ovate, pitcher-shaped, blackish. It scarcely adheres to paper.

5. P. parasitica, small, bipinnate, rigid; pinnæ alternate, becoming shorter towards the ends of the branches, which are gradually acuminate; pinnulae subulate; articulations about equal in length and breadth, striae about 3. Conf. parasitica, Smith, E. B. t. 1429. Dillw. p. 87.

Hab. On marine plants of the larger kinds. Very rare. Frith of Forth at Newhaven, Dr Richardson.

Plant scarcely more than an inch and a half long, divided into a few main divaricated branches, which are doubly pinnate; pinnæ and pinnulae alternate, regular, the latter very fine, setaceous or subulate, diaphanous under the microscope. Colour pale brown-red. It adheres slightly to paper.—A very rare plant, quite new to the Scottish Flora.

6. P. byssoides, fine red; main branches elongated, thickly set with ramuli, bearing numerous fasciculi of very slender delicate filaments; main articulations thric as long as their breadth; tubercles ovate, subsessile. Hutchinsia byssoides, Ag. Syn. p. 60. Conf. byssoides, Dillw. t. 58. Smith, E. B. t. 547.

Hab. Sea-shores, on the larger alge, very rare. Frith of Forth, opposite Seafield Baths, Dr Richardson.

From a small disk arise 1 or 2 slender filaments, 3-8 inches long, branched from the very base, the general outline of the whole being lanceolate; branches spreading, the lower ones the longest. To the naked eye, the ultimate tufts of fibres are delicate and byssoid. Striae of the joints 2-3. Colour fine rose-pink when recent; red when dry. It adheres closely to paper.—A fine species, which the Scottish Flora owes to Dr Richardson.


Filaments very numerous, capillary, 1-3 inches long, of a fine purplish-red colour very tender and flaccid; lower branches remote, elongated, upper
ones very numerous, fasciculate. Articulations with 2 striæ, sometimes intersecting each other. Tubercles roundish, ovate, mostly on very short peduncles. It adheres closely to paper.

8. P. rosea, very much branched, diffuse, fine rose colour; branchlets somewhat fasciculate; articulations rather longer than broad, pellucid, striæ several; tubercles pale, ovate, subsessile, finely dotted.


Plant 2-8 inches long, very much branched, bushy, of a fine rose colour, and tender, flaccid substance, adhering most closely to paper. Main branches few, thicker than a hog's bristle; smaller branches very numerous, repeatedly divided, and fascicled, pellucid under the microscope, and marked with two striæ, which sometimes intersect each other. Tubercles very abundant.—A most beautiful plant, of which I considered myself the discoverer, but in Dr Richardson's herbarium I find a specimen dated two years earlier than my own.

82. CERAMiUM. Roth.


Hab. Marine rocks, and on shells and stones. Common. Firth of Forth. Lobster-horn Cera-mium.—Root a callous disk. Frond usually single, 4-12 inches long, robust, firm, dark, subopake, red, becoming nearly black when dry. Articulations venose, sometimes striate in the ramuli, their joints opake (in which it differs strikingly from the last genus). Tubercles roundish, very rare. Substance cartilaginous. It does not adhere to paper.

2. C. rubrum, much branched; branches suberect, dichotomous, somewhat cartilaginous, ramuli forked at the apex; articulations ovate, pellucid in the centre, contracted at the joints; tubercles subglobose, sessile. Ag. Syn. p. 60. Hook. Fl. Scot. 2. p. 84. Conf. rubra, Dilke. t. 34. Smith, E. B. t. 1166.

Hab. On many of the larger algae, and on rocks. Very common. Firth of Forth.

Plant intermediate between the preceding and the following species. Frond mostly solitary, 4-12 inches long, much branched, weak and flaccid, twice as thick as a hog's bristle towards the base. Ramuli capillary, acute, forked, and sometimes incurved like a pair of forceps at the apex. Tubercles subglobose, sessile, with an involucre of 2-3 incurved filaments.


Hab. Sea-shores in rocky basins, on various algae. Firth of Forth, extremely common. Summer.
Plant easily distinguished from the preceding at first sight, by its diffuse mode of growth. Filaments 2-5 inches long, slender, regularly dichotomous and divaricated, remarkable from the long pellucid articulations and dark red joints. Tubercles subglobose, with an involucre of 3-5 filaments. The depth of colour varies, but the joints are always the most intense. Substance tender and flaccid.


Filaments 1-2 inches long, forming very dense, bushy tufts, of a very deep red colour when seen growing. Branches not so divaricate as in the last, and thrice as slender. Tubercles ovate, with an involucre of incurved filaments. The whorls of bristles at the joints are microscopic, and vary much in length; they sometimes occur in the ramuli of the last species, but I nevertheless consider both species as distinct. It may be observed, that the present one generally grows on rocks,—the last never.

33. CALLITHAMNION. Lyngb.


Hab. Sea-shores, on various algae. Caroline Park, Dr Richardson. Leith shore, &c. Not frequent.

Froud 1-3 inches long, branched alternately, and beautifully pinnate, the pinna short, their ramuli setaceous, and pointing one way. Tubercles shortly pedunculate, on the inner side of the pinnae, surrounded with a pellucid limbus.—Very beautiful and tender.


Hab. Sea-shores, on various large algae. Frith of Forth, rare. Joppa and Caroline Park, Dr Richardson. In various places on the coast, Messrs Arnott and Greville. Summer.

Whole plant excessively fine and delicate, 1-2 inches long, much branched, and somewhat bushy, of a purplish-pink colour. When young, it is beautifully and regularly bi-tripinnate, but in age the branches become straggling, and the pinnate character preserved chiefly towards the extremities. Tubercles inconspicuous to the naked eye, on the inner side of the ramuli.—The young plants, if moistened after having been dried, smell exactly like violets.

_Hab._ Marine rocks. Frith of Forth. Caroline Park, Dr Richardson. Rocks in the Frith, Messrs Arnott and Greville. Abundantly on the large stones under the woodwork of Leith Pier.

Spreading in broad crimson tufts over the rocks and stones. Filaments 2–3 lines high, erect, branched. Fructification unknown.

**GRIFFITHSIA.** *Agardh.*

1. _Gr. setacea,_ bright crimson; filaments growing in tufts, dichotomous, straight, attenuated; articulations four times as long as broad or more, slightly incrassated upwards; sporules many, surrounded by a pellucid limbus, the whole contained in a pedunculated filamentous involucre. *Ag. Syn.* p. xxviii. *Conf. setacea,* *Smith,* E. B. t. 1689. *Dillw.* t. 82.

_Hab._ Sea-shores. Frith of Forth, frequent, chiefly in rejectamenta.

Filaments forming lax tufts, 3–5 inches long, of a rich pink or crimson colour, in some states partly bright orange; dichotomous, straight, the apex attenuated. Articulations very long, cylindrical. In drying, it gives out a fine pink colour.


_Hab._ Sea-shores. Very rare in the Frith of Forth, Mr Yalden.

Plant 3–6 inches long, of a red clay colour, with a rough and spongy appearance, from the numerous imbricated whorls of filaments which cover the branches. The fructification has not, I believe, been seen by any one.—This genus is dedicated by Agardh to my friend Mrs Griffiths of Devonshire, whose many discoveries in marine vegetation truly entitle her to this distinction,—the highest that one botanist can confer on another. *Conf. coralina, barbata_ and _multifida_ belong to Griffithsia.

**SECT. II. Frond olive-green or brownish.**

85. **CLADOSTEPhUS.** *Agardh.*

1. _Cl. verticillatus,_ brown; frond branched dichotomously; branches thickly set with whorls of short, incurved, simple or forked filaments; articulations shorter than broad. *Ag. Hook.* Fl. Scot. 2. p. 89. *Conf. verticillata,* *Dillw.* t. 55. *Smith,* E. B. t. 1718.

_Hab._ Sea-shores in rocky basins. Frith of Forth, Lightfoot. (Rare).

Plant 3–6 inches long, olive-brown, wiry, branched in an irregularly dichotomous manner, and closely set with distinct whorls of very short filaments, about half a line long. Fructification unknown. It does not adhere at all to paper.
86. **SPHACELLARIA.** Lyngb.


Hab. Sea-shores. Frith of Forth occasionally, but not frequent.

Plant 2-3 inches long, much branched, and forming a dense tuft. Branches very crowded, approximate; ramuli fasciculate, set with distichous pinnae about a line long. Apex of the branches somewhat sphacellate (appearing as if scorched or gangrenous). Substance rigid when dry.


Hab. Sea-shores, on alga, corallines, &c. Frith of Forth, abundantly, in rocky basins.

About an inch high, often much less, very densely tufted, of an olive-brown colour; the tufts presenting a rigid, bristly appearance, from the entangled straight pinnae which spring from the branches, and have acute apices. The branches can only be called pinnae (as Mr Dillwyn justly observes), towards the extremity. Tubereles globular, sessile.


Hab. Sea-shores. Portobello Sands, Dr Richardson. Caroline Park, and near Newhaven, not frequent.

Plant 1-4 inches in length, greenish-brown, rather flaccid when moist, less rigid than the preceding when dry, branched; main branches elongated without visible articulations, more or less subdivided, pectinate, with spreading ramuli of equal length, mostly opposite, the apex sphacellate.


Tufts 1-2 lines high, crowded, dense, olive-green. Filamenta very fine, erect, branched; branches seldom divided, of various lengths, spacelate at the apex. Articulations visible to the very base, a little longer than broad. Substance tender, yet slightly rigid.

5. Sph. racemosa, small, tufted, olive-green; filaments twice or thrice dichotomous; articulations equal in length and breadth; tubercles oval, racemose, on branched peduncules.

Hab. Sea-shores. Frith of Forth, opposite Caroline Park, Dr Richardson. February.

Tufts about an inch high, erect? rather rigid. Filamenta equal, slightly incrassated at the summit, which is sometimes but not constantly spacelate: it is however pellucid. Pedunculus of the fructification arising laterally from the branches, divided into several filaments, each supporting an oval tubercle, mostly filled with a granular olivaceous mass, and furnished with a narrow pellucid limbus.

87. ECTOCARPUS. Lyngb.


Var. β, ruber, articulations equal, reddish, the joints pellucid.

Var. γ, protensis, articulations equal, brown; ramuli opposite and alternate, the ultimate ones fasciculate, second, remote. Hab. Marine rocks. Frith of Forth, extremely common. β, On old Fucus serratus. γ, On the wooden framework of the Leith Pier. Spring.

Tufts 3-8 inches long, very branched and bushy, but often from the action of the water interwoven and twisted into woolly cords. Branches attenuated at the apex. Tubercles globose or subovate, greenish, sometimes shortly pedunculate. Colour yellowish, reddish, or greenish-brown. It adheres closely to paper.


This species resembles the preceding in habit and size. Branches attenuated, alternate. Articulations half as long again, or even twice as long as broad. Fructification opake, lanceolate, pod-like bodies, on the sides of the branches. It adheres closely to paper.
815


*Tufts* half an inch to above an inch broad, convex, 2–4 lines high, of a deep orange colour, the filaments branched, entangled. *Articulations* dark, half as long again as broad, or even more, the joints pellucid. *Tubercles* ovato-globose, sessile on the branches, surrounded with a pellucid limbus. It becomes fragile in drying, and eventually of a greenish-grey colour.—Scarcely of this genus, and perhaps nearer to *Callithamnion.*

**Div. VI. Confervoideae.** Filaments jointed, simple or branched, cylindrical, tubular, membranaceous, sometimes gelatinous. *Fructification* very minute sporules within the articulations.—Marine and fresh-water plants, of various colours.

**88. CONFERVA. Linn.**

* Marine.

+ *Filaments* simple.

1. C. *tortuosa,* green; filaments simple, slender, rather rigid, entangled and tortuose; articulations near thrice as long as broad, the joints pellucid. *Dillw.* t. 46. *Smith,* E. B. t. 2220.  


*Filaments* very tortuous, entangled in crisped masses of two or three inches in length, of a dark green colour, and attached to the rocks, or the ground where covered with broken shells, &c. *Substance* tenacious. It does not adhere to paper.

2. C. *intricata,* filaments simple, green, very short and minute, entangled, tortuose; articulations twice as long as broad.  

Hab. Sea-shores; intimately attached to tufts of *Sphacellaria penna.*  

Opposite Caroline Park. Spring.

*Filaments* excessively fine, not many lines long, but the length cannot be ascertained, from the manner in which they are entangled in the *Sphacellaria* on which they grow. They are very tortuous, and, as well as the articulations, closely resemble *Conf. implexa* of *Dillwyn,* but that is from an inch to a foot in length, whereas the present species never elongates so as to project from the small plant amidst whose branches it is entangled. I have watched it for a twelvemonth.

3. C. *Melagonium,* filaments green, simple, solitary or aggregate, thickish, straight, rigid; articulations twice longer than broad, alternately collapsed when dry. *Dillw.* Syn. p. 48. t. B.

Filaments rising from a minute scutate base, erect in the water, 3-6 inches high, straight, obtuse at the apex, and attenuated below, of a dark green colour. The length of the articulations varies. It does not adhere to paper, and is flaccid when dry.


_Hab._ Sea-shores, parasitic chiefly on Fucus nodosus and vesiculosus. Frith of Forth, frequent. Summer.

_Tufts_ about half an inch long, often much less, of a brownish-green colour, flaccid. _Articulations_ marked in the centre with a brown spot; the joints obscure, but pellucid when dried. It adheres to paper.

5. C. fucicola, yellow-brown; filaments short, straight, simple, tufted; articulations twice as long as broad. Dillw. t. 66. Lyngb. p. 146. t. 50.

_Hab._ Sea-shores, parasitic on Fucus vesiculosus and nodosus. Frith of Forth frequent. Summer.

_Tufts_ half an inch or three quarters of an inch long, of a yellow, reddish, or orange-brown colour; the filaments very numerous, and separating from the tuft in fasciculi. _Articulations_ 2-4 times longer than broad. It adheres moderately to paper, and is glossy when dry.

†† Filaments branched.

6. C. lanosa, yellowish-green; filaments branched in a straight, fasciculated manner; branches remote, elongated; lower articulations twice as long as broad, upper ones four times as long. Dillw. Syn. t. E. Smith, E. B. t. 2099. Hook. Fl. Scot. 2. p. 82.

_Hab._ Sea-shore, parasitic on various algæ. Black Rocks, Leith, on Furcellaria lumbricoides, Messrs Arnott and Greville. Summer.

_Tufts_ near an inch long, divided as it were into several bushy bundles of very crowded filaments. _Articulations_ pellucid, with scattered granular masses, and sometimes contracted at the joints. It adheres moderately to paper.


_Hab._ Marine rocks, very common. Frith of Forth, everywhere. Summer.

_Root_ a small disk. _Filaments_ deep green, with an occasional glaucous tinge, rigid, straight, 2-6 inches long, forming dense tufts. _Branches_ often arising 3 together, the dichotomies very acute. _Articulations_ when dry alternately compressed. It does not adhere to paper.
** Growing in fresh-water, (C. ericetorum is sometimes found in water).**

† Filaments simple.

8. **C. dissiliens**, filaments simple, very fine, lubricous, very fragile; articulations shorter than broad, often pellucid, and separating at the joints. **Dillw. t. 63. Hook. Fl. Scot. 2. p. 81.**

**Hab.** Ditches and pools. Near Edinburgh, Messrs Arnott and Greville. Filaments forming floating tufts of a green colour, 2-5 inches long. Articulations with a green mass filling up the centre like a transverse band, the joints pellucid. The articulations often separate, and the portions are frequently seen adhering by one angle.

9. **C. fugacissima**, filaments green, simple, very fine, soft; articulations a little longer than broad, the centre of each having a green band. **Dillw. Syn. p. 43. t. B. Lyngb. p. 137. t. 46.**

**Hab.** Ditches and ponds. Duddingston Loch, and elsewhere, abundantly. March.

Filaments densely entangled, and floating in large masses or strata, of a yellowish or brownish-green colour. The joints of the articulations are sometimes obscure. It adheres to paper.—I cannot agree with Sir J. E. Smith, who unites this to the following, than which it is much more robust, fine as it is, besides the great disparity in the articulations.

10. **C. sordida**, dirty green; filaments simple, excessively fine, web-like; articulations mostly pellucid, 3-4 times longer than broad. **Dillw. p. 60. Smith, E. B. t. 2303., excluding var. β.**

**Hab.** Ditches and pools, frequent. April and May.

Plant forming a light semitransparent cloud round the stems of aquatic plants, of a reddish or yellowish dirty green colour. Sometimes, when old, floating in large masses on the surface. Articulations very diaphanous. It adheres to paper.

11. **C. punctalis**, green; filaments simple, exceedingly fine, lubricous; articulations nearly twice as long as broad, the granular mass at length collapsing into a series of solitary globules. **Dillw. t. 51. Lyngb. p. 133. t. 46.**

**Hab.** Pools, ditches, and slow streams. King’s Park. March.

Plant growing in small floating masses, 1-2 inches broad, of a pale and sometimes yellowish-green colour. Filaments excessively minute, scarcely visible to the naked eye. Articulations marked at first with a green band, but this at length is collapsed into a round globule. It adheres to paper.

12. **C. vesicata**, green; filaments simple, slender; articulations inflated here and there, and occasionally proliferous; articulations rather longer than broad. **- Hook. Fl. Scot. 2. p. 82. Conf. alternata, Dillw. Syn. t. B. Smith, E. B. t. 2304.**

**Hab.** Ditches, pools, and marshes. King’s Park. March.

Filaments several inches long, densely interwoven into floating masses. Articulations inflated at irregular intervals into roundish vesicles, and
sometimes alternately marked with bands of brown and green. It adheres to paper.

13. C. rivularis, green, filaments simple, straight; very long, floating; articulations above twice as long as broad, alternately compressed when dry; the joints pellucid. Dillw. t. 39. Smith, E. B. t. 1654. Hook. Fl. Scot. 2. p. 82.

Har. Streams, very frequent. Spring and summer.

Crow-silk.—Plant floating in tufts 1–3 feet long or more, of a full green colour. Filaments often twisted into cord-like masses by the action of the water. Articulations 2–4 times longer than broad, mostly filled with a green granular mass. It adheres moderately to paper.

†† Filaments branched.


Har. Streams. In a small stream near Saughton. Spring.

Plant growing from wood or stones, in dense, lubricous tufts, 4–6 inches long. Filaments very flaccid, attenuated at the apex, set with numerous fasciculated acute ramuli, of various lengths. It adheres closely to paper.

15. C. fracta, dull green; filaments rigid, much branched, flexuose; branches and branchlets divaricated, alternate; articulations 4–5 times as long as they are broad. Dillw. t. 14. Smith, E. B. t. 2338. Hook. Fl. Scot. 2. p. 82.

Har. Ditches and stagnant water, frequent. Spring and summer.

Filaments densely entangled, several inches long, floating in large masses on the surface of the water. Branches remote, irregular, sometimes second, the ramuli more numerous, attenuated. Colour yellowish or dirty green. Substance rigid, fragile, especially when dry. It adheres slightly to paper.


Har. Streams, ditches, and in the sea, extremely common. Summer.

Filaments forming bushy tufts of a full or yellowish-green colour, rather flaccid, the ramuli numerous, second, and to the naked eye appearing like small pencil-like fasciculi. Articulations long, cylindrical, filled with a dark green granular mass. It adheres very slightly to paper.

*** Not growing in either salt or fresh water.

(C. ericetorum is sometimes found in shallow water).

17. C. ericetorum, purple; filaments simple, densely interwoven into a thin procumbent stratum; articulations rather

**Hab.** On the ground, in moist heathy places, Ravelrig-Toll Moss, abundantly; and on the Pentland Hills. Spring and summer.

Filaments very fine, interwoven into a dense thin web, of a fine purple or brownish colour, covering the naked soil for some inches or even some feet. When found in water, as it must sometimes be, from the hollows in which it grows being filled up, the filaments are floating, and more or less diffuse.


**Hab.** Damp ground and banks, especially where *Polytrichum aloides* grows. The whole year.

Filaments spreading like a velvet web over the ground to a great extent, creeping and throwing out radicular fibres here and there, apex of the branches obtuse. Articulations variable in length, partly pellucid and partly green and opake. It does adhere to paper.—I believe with Mr Drummond of the Cork Botanic Garden, that this species is nothing more than the commencement of *Polytrichum aloides*; but have inserted it, in order to draw the attention of botanists still more to this subject.


**Hab.** On the ground on hedge-banks, creeping over sticks, stones, &c. Slateford, and elsewhere about Edinburgh.

Filaments creeping in small tufts, sometimes an inch broad, of a brown chestnut colour, which is paler and more transparent towards the extremities, where the articulations are much shorter than in the main branches.—This, like the last, is probably the commencement of some species of moss.


**Hab.** Parasitic on various species of *Orthotrichum.* Very frequent. Summer.

Tufts from half a line to about two lines high, spreading in a compact manner among the branches and leaves of *Orthotricha.* Filaments entangled. Substance rigid and fragile, not adhering to paper.—In this neighbourhood it is usually very minute.


**Hab.** On rocks and trunks of trees, not unfrequent. Rosslyn and Auchindenny woods. The whole year.
Zygnema.

Plant forming broad, very dense, quite black, velvet-like tufts or masses, 1-3 lines high. Filaments rigid, somewhat cartilaginous, not adhering in the least to paper.

89. ZYGNEMA. Agardh.

1. Z. genuflexum, filaments very fine, lubricious, fragile, united here and there by angular bends or genuflexions; articulations four times as long as broad, the granular mass forming a longitudinal line. Ag. Syn. p. 98. Conf. genuflexum, Dillw. Smith, E. B. t. 1914.


Plant floating in entangled masses on the surface of the water, of a yellowish or pale green colour, and slippery, soft, fragile substance. Filaments remarkable from their angular bends, at which they unite with each other. I have seen the tubercles figured by Dillwyn, Suppl. t. G.

2. Z. deciminum, filaments simple, lubricious; articulations nearly thrice longer than they are broad, containing two spiral lines of granules intersecting each other, at length collapsing into a single mass. Ag. Syn. p. 99. Conf. nitida, Dillw. t. 4. figs. A—B. Smith, E. B. t. 2337. 'Conf. jugalis, Dillw. t. 5.


Plant growing in large, deep, bright green masses. Filaments shining, well marked by the spiral lines of granules within the articulations, forming repeatedly the figure of the Roman X. The filaments are rarely seen united.

3. Z. quinimum, filaments simple, lubricious; articulations twice as long as they are broad, and containing a single spiral line of granules. Ag. Hook. Fl. Scot. 2. p. 80. Conf. spiralis, Dillw. t. 3. Smith, E. B. t. 1656.

Hab. Ponds and ditches, frequent. Spring and summer.

Plant green, floating on the surface of the water in large masses, slippery to the touch. Filaments 2-3 times longer than broad, containing a spiral line of granules, forming repeatedly the Roman V; the joints obscure. Before the filaments unite they are lubricious, and adhere to paper; afterwards, they lose their lubricity, and are fragile, scarcely adhering to paper.

4. Z. bipunctatum, filaments simple, lubricious; articulations twice the length of their diameter, containing two globular masses of granules. Lyngb. p. 174. t. 60. Conf. bipunctata, Dillw. t. 2. Smith, E. B. t. 1610.


Plant floating in entangled masses on the surface of the water, lubricious, yellowish-green. Articulations varying in length, containing two distinct masses of roundish granules; the joints obscure. It adheres to paper.
90. FRAGILLARIA*. Lyngb.


Plant growing in dense floating tufts, attached to stones, sticks, &c. 2-4 inches long, and of a brown colour; very soft to the touch, and difficult to remove from the water, on account of its fragility. Filaments plane, attenuated, beautifully articulated, plane yet tubular? In drying it becomes pulverulent, yellowish or greenish-grey.

91. DRAPARNALDIA. Bory.


Plant floating in very gelatinous tufts, of a bright green colour, 2-5 inches long, attached to stones, sticks, &c. On removing it from the water, it is very apt to slip through the fingers. Articulations of the main branches pellucid, with a green tinge in the centre; those of the branchlets as long as broad, wholly green. Branchlets spreading. It adheres most closely to paper, and is truly beautiful.

IX. CHÆTOPHOROIDÆ. Grev.

92. CHÆTOPHORA. Schrank.

* Growing in fresh water.

1. *Ch. elegans*, green, more or less globose, solid; filaments dichotomous, the branches divaricated; branchlets fasciculate; articulations longer than broad. *Ag. Lyngb. p. 192. t. 65. Rivularia elegans*, *Smith, E. B. t. 1797.*


* A genus apparently nearly allied to this (*Diatoma, De Cand.*), contains many microscopical objects, which I now concur with my learned friend Dr Fleming of Flisk in believing to possess an animal structure. These are, *D. flocculosum, tenue, arcuratum, and obliquatum* (formerly described as *Confervae*). *Fragillaria striatula* and *pectinalis* (*Confervae* of authors), I consider in the same light. *Conf. stipitata, Bidulphiana* and *tenueformis* of Eng. Bot. and the whole genus *Echinella* of Acharius and Lyngbye are equally doubtful. Dr Fleming, indeed, has seen some of them in motion. Most of them have been found in Scotland.
Linckia.

322 CRYPTOGRAMIA. CHÆTOPH. Linckia.

Plant irregularly globose, from less than a pea to a hazel-nut in diameter, firm, solid, gelatinous. Filaments radiating from a central base. Articulations pellucid.

** Marine.


Hab. Sea-shores, attached to rocks, corallines and various Algae. Frith of Forth, frequent. Autumn.

Plant gregarious, from the size of a pea to that of a small walnut. The surface is gelatinous, but the substance coriaceous. Filaments hyaline, jointed, the apex of the branches terminating at the surface in dark, cuneiform granules.

93. LINCKIA. Mich.

* Growing in fresh water.

1 L. dura, green, globose, solid; filaments simple, straight, arising from a central base, acuminate, cleft at the apex, shortly exserted, inarticulate. Lyngb. p. 197. t. 67.

β. calcarea, filaments intermixed with calcareous particles, hard and crustaceous when dry. Rivularia calcarea, Smith, E. B. t. 1799.

Hab. Lakes and marshes, attached to aquatic plants, &c. β. On moist precipitous rocks and beds of alpine streamlets. β. On the Pentland Hills, rare. The whole year.

Plant roundish, from the size of a small pea to a walnut, more or less green, firm and hard, but with a very slippery surface, often covering the bed of small cascades, in undulated confluent masses. Filaments inarticulate, very straight and slender, the apex laciniate. Among the filaments, and apparently attached to them, are numerous, black, subopaque bodies, which are not yet understood.

** Marine.


Hab. Sea-shores, on various Algae and on stones and wood-work. Frith of Forth, frequent.

Plant rather larger than mustard-seed, gregarious, scattered, very hard, and adhering closely to the objects on which it grows. The surface lubricous.

94. NOSTOC. Paracel.

1. N. commune, greenish, shapeless, solid, plicate, waved;
Palmella. Cryptogamia. Chætoph. 323


Plant of a soft gelatinous substance, 1–3 inches broad, shapeless, plaited and lobed, solid. Filaments loosely interwoven. In dry weather, it dries up extremely speedily.


Plant an inch in diameter or more, very gregarious, clustered, all sizes growing together, from that of a pea to a large walnut, very dark blackish green, upake, more or less hollow. In old age, becoming weak, flaccid, and much distended, often ruptured, and spread out like a membrane. The surface is verrucose only under the microscope. It adheres well to paper, if merely laid upon it, and suffered to evaporate without pressure.

95. Palmella. Lyngb.

1. P. botryoides, distinct, solid, very minute, aggregate, globose, deep green, gelatinous, containing numerous elliptical sporules. *Lyngb.* p. 205. (Not Lepraria botryoides of authors.)


Spreading like a thin stratum over the soil, of a full deep green colour, and at first sight resembling *Lepraria botryoides*, so common on the trunks of trees in winter. The separate plants are scarcely so large as poppy-seed. The sporules are diffused through the whole mass, and are elliptical.

2. P. protuberans, green, shapeless, solid, gelatinous, spreading among wet mosses; sporules elliptical, numerous, diffused through the whole mass. *Ulva protuberans, Smith,* E. B. t. 2583.

Hab. On wet rocks, attached to, and enveloping mosses. Pentland Hills. Spring to Autumn.

Mass half an inch to two inches broad, half an inch thick, olive green, somewhat diaphanous, very tender and gelatinous. Sporules, according to Smith, projecting, and at length deciduous. This I have not observed myself.


Hab. On various lichens, or in their immediate neighbourhood, either on trees or stones. About Edinburgh, occasionally. Above Burntisland, on the stone walls, parasitic on *Parmelia stellaris* and *Borrera tenella.*

Plant scarcely more than a line in diameter, often much less, rather gregarious, fine opake pink, very soft and fragile. Sporules very minute, roundish-ovate. When moistened it falls away instantly.

x 2
X. LICHENES. *Hoffm.*

96. SPILOMA. *Ach.*


*Hab.* On the bark of trees. Rosslyn, by the river side, Maughan. Swanson wood, and probably other places near Edinburgh.

The crust is rather smooth, sometimes traversed by very slender fissures. Fructification often plano-convex, of various forms; within, of nearly the same colour, and somewhat more compact.

97. LECIDEA. *Ach.*

*(Plant crustaceous, uniform.)*

*Fructification always black, naked, (not pruinose).*


*Hab.* Upon rocks. Orock Hill.

It covers the rocks, says Acharius, in the same manner as *L. atro-virens.*

The white areolae vary considerably in their swollen appearance; sometimes they are few, and but slightly convex, at other times so prominent and crowded, as almost to obliterate the fructification.


*Hab.* On rocks. Pentland Hills, Dr. Walker.

The fructification of this species is liable to change its character in some degree from age; the areolae becoming thicker, and elevating it or rising above it. Acharius removed it from the *Lecidea* of his Method. *Lich.* to the *Lecanora,* in his *Lich.* Universal, but found it necessary to restore it to the *Lecidea* again in his *Syn. Lichenum.*


*Hab.* Rocks and stones. On stones in walls about Edinburgh, frequent, Maughan.

Disk small, never convex. Fructification elevated in age, and then sometimes surrounded by a spurious border formed by the crust.

4. *L. confluentus,* crust tartaraceous, somewhat spreading, cracked and areolated, subeven, greyish-brown; fructification sessile, at length irregular, convex, subglobose, confluent, black, bor-


The crust varies much in colour, from grey or a subglaucous hue to a ferruginous brown. Both the areole and the fructification become irregular in age. In a young state the fructification is regular, plane, and decidedly bordered.


A variable species, yet I trust sufficiently marked by the Acharian character. The fructification is generally flatish or subconvex; it is sometimes, however, subglobose, and also more or less bordered, rather scattered, crowded or even confluent. The crust, according to circumstances, is smoothish, subgranulated, or even rugose, but rarely cracked.


The crust varies in colour from whitish to greenish, is at first subgranulated, in old age rugoso-squamose, and extremely unequal.


α. geographica, areole yellow, plane, angular, bounded by a black line, and crossed, by others of the same colour. Lichen geographicus, Smith, E. B. t. 248.

HAB. On rocks and stones. α. On the Pentland Hills, but not common. β. On the Pentland Hills. Both α and β occur in the King’s Park, Maughan.

The colour of the areole varies from greenish yellow to a pale sulphur colour. This species is so well marked, that it needs no farther description.

Cryptogamia. Lichenes. Lecidea.


The crust is very thin, not unfrequently pulverulent in old age. Fructification very minute, at first appearing like a punctiform depression in the crust, with the border raised; the disk afterwards becomes convex or even hemispherical.


The fructification is extremely rare, which renders it very liable to be mistaken for a Lepraria by the student.

** Fructification black, pruinose.


The pruinose appearance of the apothecia is very persistent, and is scarcely absent even when the plant is moist.

*** Fructification orange, red, flesh-colour, or brown.

11. L. cinereo-fusca, crust thin, somewhat cracked, uneven, greyish white; fructification plane, at length angular and irregular, yellowish or reddish brown, the border narrow, persistent. Ach. Syn. Lich. p. 43.

Hab. Trunks of trees, and on rocks. King's Park; Pentland Hills; Corstorphine Hill, Maughan.

When growing on rocks the crust is thicker, cracked and tessellated. In old plants the disk of the fructification is sometimes raised, and varies from a red to a brown colour; but the border remains constant, and in an old state becomes variously flexuose.


Hab. Old trunks of trees; old walls and rocks among moss. Near Colinton. Auchindenny and Rosslyn woods, and elsewhere, not common.

Fructification very rare, and only figured in English Botany. The plant is very irregular in its mode of growth, frequently covering the moss, dead leaves, and stems of grasses and branches that happen to be near it, in a very beautiful manner; it is extremely light, and of a whitish or glaucous colour.

**Hab.** Dead and putrefying trunks of trees. About Edinburgh, Maughan. Swanston wood, on old stumps of fir trees.

*Crust* extremely spreading, more granulated than pulverulent, of various shades of green, often tinged with brown or yellow. When dry, frequently greyish green. *Fructification* irregular and rough from its younger state, and scarcely furnished with a regular border.


**Hab.** On rocks, stones and trunks of trees. Auchindenny and Rosslyn woods; Pentland Hills.

In the young plant the fructification is small, plane, with the border entire; in perfection it is large, with the border crenate or undulate; in old age hemispherical, the border sometimes disappearing, and the colour obscure.


**Hab.** Heathy places on the ground. Heaths near Balmuto. Pentland Hills.

A species so well marked as not to be mistaken for any other.


**Hab.** On the ground, in heathy places. Turf wall surrounding the reservoir on the Pentland Hills.

*Crust* very thin, rarely subpulverulent. *Fructification* when young having a small punctiform disk, which, as the plant advances in age, enlarges, and remains permanently concave; the border is naked and entire.


*β. polytropa*, crust subtartaceous, tessellated, pale; fructification nearly plane, clustered, with the border lobed, flexuose, at length subglobose, yellowish flesh-colour; the border vanishing. *Lichen polytropus*, *Smith*, E. B. t. 1264.
328 CRYPTOGRAMIA. LICHENES. CALICICUM.


Crust sometimes cohering, cracked, sometimes subpulverulent, at others almost absent. Fructification in old age becoming angular from the apothecia pressing against each other.


Hab. On rocks. North Queensferry, Messrs D. Turner and Dr Hooker.
The crust varies from pale to deep yellow, occasionally having also a greenish cast. Fructification subimmersed, the border scarcely perceptible; in old age sometimes tuberculose and irregular.

98. CALICICUM. Ach.


Hab. On the naked wood of dead trees. Auchindenny woods.

Crust between granulated and pulverulent, very thin. Fructification almost sessile when young, afterwards furnished with a short, rigid, black, cylindrical peduncle.


Hab. On the rugged cleft bark of old trees. On oak trees in Rosslyn woods, G. Don.

Crust varying with a yellowish or greenish tinge, exceedingly thin. Peduncles of the fructification nearly a line high, and very slender. Two heads sometimes occur on the same peduncle.


Hab. On trunks of trees, old pales, about the bottom of hedges, even on the ground. Near Slateford, rare.

Crust very bright greenish yellow, irregular, spreading, granulated. Fructification on very slender peduncles, fully a line high.

99. GYROPHORA. Ach.

G. deusta, roughish, olive-brown, sprinkled with a black dust, smooth beneath, with punctiform hollows, pitted, naked, fructification plane, plaited in a circular manner, at length con-
Endocarpon. Cryptogamia. Lichenes. 329


Hab. Rocks, Corstorphine and Craiglockhart Hills, Maughan.

Often very rough with little elevated points; sometimes lacerate at the margin; irregularly flexuose and plicate towards the centre underneath. The only species that I am acquainted with in this neighbourhood.

100. Endocarpon. Hedw.


Hab. On the ground, and in crevices of rocks in barren and stony places.

On Arthur's Seat, in the King's Park, Edinburgh, particularly on the west side, about half way up.

The form of this lichen varies considerably, as does also its colour; the lobes are sometimes a good deal imbricated, and often suberect at the margin. Colour usually olive; but green, brown, and even nearly black specimens occur.


In the old state the substance is rigid and brittle; the colour above is whitish, greyish or obscure; underneath, more or less pinkish, somewhat orange, or brownish. Lobes polymorphous, and occasionally rather imbricated.


Hab. On rocks with the preceding. Balmuto.

The suberect and very complicated lobes serve to distinguish this plant. Acharius mentions having seen it simple and peltate; but such instances are extremely rare.


Hab. On rocks and stones, by the sides of, or in streams of water. Auchindenny, rare.
Very much resembling \textit{E. complicatum}. Colour when moist, green; when dry it is sometimes blackish brown, never glaucous; underneath it is sometimes quite black.

101. \textbf{THELOTREMA}. \textit{Ach}.


\textit{Hab.} On the bark of trees. On the common holly, at Bilston Burn, near Edinburgh, G. Don.

A well marked species. In age the crust becomes thicker and unequal, the warts of the fructification more hemispherical than conical, and the margin blunt and tumid.

102. \textbf{VARIOLARIA}. \textit{Pers}.


\textit{Hab.} Trees and rocks. Braid Hermitage, Maughan.

\textit{Soredia} frequent, convex and white. \textit{Warts} nearly solid, large, subglobose, pulverulent on the top, and containing within, a large concave fructiferous stratum.


\textit{Hab.} On the bark of trees; about Edinburgh, not unfrequent.

The very bitter taste of this species is sufficient to distinguish it from any other found in this neighbourhood.


\textit{Hab.} On rocks and stones. Pentland Hills, not rare.

A distinct species, having somewhat the habit of \textit{Isidium corallinum}.

103. \textbf{URCEOLARIA}. \textit{Ach}.

1. \textit{U. Acharvi} crust of a subdecided form, smooth, crossed by very narrowacks, pale brick colour; disk of the fructifi-

Hab. On rocks. Habbie's How, in the Pentland Hills, and on large stones in several rivulets near the same spot. I have not seen var. β. near Edinburgh.

Crust extremely thin, and so attached to the rock, that it is impossible to separate it. It has sometimes the appearance of a reddish or yellowish stain. The disk becomes nearly plane in age.

2. U. scruposa, crust rugoso-plicate, granulated, white or greyish; fructification urceolate, the disk black, the border swelling, inflexed, subrugose, covering the disk. Ach. Syn. Lich. p. 142. Smith, E. B. t. 266.


Crust solid, frequently thick, and generally very rugose and uneven. Border of the fructification very prominent, more or less crenate; waved in age, and then somewhat exposing the immersed disk.

104. LECANORA.

* Adnate, uniform.

† Disk of the fructification black, naked.


Hab. Walls and rocks, frequent.

Crust granulated, not pulverulent, brittle, not thick. Fructification with a coal-black disk, and raised white border, often very plentiful.

†† Disk of the fructification brown.

2. L. argopholis, crust smooth, uneven, warted, pale; warts at length subimbricated, somewhat lobed and deformed; disk of the fructification concave, brownish black, the border sharp, crenulate, contracted. Ach. Syn. Lich. p. 147.


Colour pale, sometimes verging to greenish. Warts aggregated and deformed. Disk of the fructification very concave, the border raised, and in old age thin, crenulate and sublacerate.


Hab. On trees, rocks, old walls, &c. Braid, Rosdyn, Auchindenny, Corgin, Corstorphine, &c.
A variable plant, in the colour of both crust and fructification, as also in the form of the latter; whence several species of other authors have been reduced to varieties by Acharius; among the rest, *Lichen pallidus* of Dickson. So few species of this division, however, occur near Edinburgh, that less difficulty will be experienced by the student. The fructification is liable to become very convex in age.

+++ *Disk of the fructification flesh-colour, pale yellowish, or orange.*


_Hab._ On rocks, stones, walls, and more rarely on trunks of trees. Walls by the sea-side at Granton. Pentland Hills, &c.

_Crust_ rather thick, often much tessellated, the areoles very turgid and prominent; the border of the fructification remarkably thick.


_Hab._ On rocks, sometimes even on the ground. Pentland Hills.

The _colour_, according to Acharius, varies from white, or slightly glaucous, to greenish. _Crust_ sometimes pulverulent. _Disk of the fructification_ convex in age, lobed, flexuose, rough and cracked.


_Hab._ On wood, old pales, railing, &c. About Edinburgh.

_Crust_ irregular, granulated, not unfrequently quite covered by the fructification. _Colour of the disk_ but little deeper than that of the crust. _Border_ pretty regularly pulverulent, rarely naked. The whole plant in age and decay becomes of an obscure hue.

+++ +++ _Disk of the fructification either brown or bright red._


_Hab._ On rocks and stones in alpine situations. On the Pentland Hills.

_Crust_ tartareous, thick, extremely rough and uneven in age. _Border_ of the fructification eventually disappearing from the rising and swelling of the disk. _Colour of the crust_ whitish, greyish, sometimes greenish.


*Crust* growing very uneven, thick, and cracking in an old state. *Disk* of the fructification at first concave, and immersed in the crust, afterwards becoming convex, and sometimes obliterating the border. The bright red colour of the disk sufficiently distinguishes this beautiful lichen.

**Adnate, radiato-stellate, and somewhat lobed in the circumference.**


In a young state very irregular in form; the middle roughish, warty, and occupied by the crowded fructification. *Colour* of the crust becoming paler in age, and the centre much cracked and dispersed; the segments or lobes of the circumference are thus often detached.


Hab. On rocks and walls. King's Park, Maughan.

*Crust* very regular in form, orbicular, and except a small part of the circumference, almost covered by the fructification; where, however, the crust is visible, it is warty, cracked, and uneven. *Lobes* radiating, regular, convex, sublinear, ultimately nearly plane, lobato-crenate, waved. *Colour* varying from white to pale yellowish.


*Crust* rarely completely circular; the segments of the lobes linear, somewhat dilated, and cut at the apex. *Colour* nearly the same on both sides. *Disk* of the fructification plane, the border a little raised, and free underneath.

*β. dispersa*, crust interrupted, granulated, uneven, and subcinereous, or wanting; fructification scattered, the disk plane, glaucous brown, or black, with a thin, raised, crenulate border. *Ach. Syn. Lich.* p. 188. *Lichen crenulatus*, *Smith*, E. B. t. 930.

**Hab.** Rocks, walls, and stones, particularly such as are calcareous. Common on walls about Edinburgh, Maughan.

The lobes of the crust are most perfect in the youngest specimens; in old age they disappear. *Crust* extended, and almost obliterated by the fructification, which is excessively crowded, and more or less distorted by mutual pressure. In *β* the fructification is often smaller, the disk varying in colour, and the border crenulate. The crust in this var. is frequently quite absent.

***Imbricated.***


**Hab.** On rocks and stones, and on the ground. King's Park, Lightfoot. Pentland Hills.

This species varies somewhat in its character in different situations. When growing on the ground, or stones covered with soil, every part is larger, the lobes rounder and thicker, and the fructification larger than when attached to naked rocks. In the latter case the crust is paler, and often of a glaucous hue; in this state it is most common in the King's Park.


**Hab.** Trunks of trees, rocks, walls, and stones. King's Park, Maughan. *Crust* irregular; lobes variously laciniate, toothed, crisped, very crowded, of the same colour on each side, the margin always pulverulent. In a young state the fructification is somewhat paler, in old age somewhat darker than the crust, and scarcely rising above the entire border.

**PARMELIA. CRYPTOGRAMIA. LICHENES.**

**HAB.** On the ground, and on decaying mosses. Rosslyn wood, Maughan. Pentland Hills, in several places.

Crust imbricated throughout with round, shapeless scales or blunt granular lobes.


**HAB.** On the ground; tops of earthen dikes, &c. Pentland Hills, Maughan. Wall-tops at Colinton.

Crust imbricated throughout, and often so much granulated as to conceal the appearance of lobes; the innate fructification and persistent border is sufficiently characteristic to prevent confusion.

105. PARMELIA. *Ach.*

* Lobes not inflated at their extremities. (Circinaria.)


One of the larger species with a pale glaucous livid hue, very smooth, and conspicuous from the singular excrescence-like bodies scattered on its surface. Substance firm and rather brittle. Lobes sinuous, much rounded at the extremity. Fructification rare.


HAB. On rocks and trunks of old trees. Craigleith Hill, Maughan. Pentland Hills, but not in fructification.

This species is almost as large as the preceding, but not nearly so coriaceous nor so regular in its general figure. Surface moderately smooth, but traversed by flexuose lines or ruge, generally more or less granular or pulverulent; beneath it is thickly set with short dark fibres.


HAB. On trunks of trees. Swanston wood, rare.

Membranaceous, smooth, but not shining. Lobes subimbricated, broad, and rounded at the extremity. Fructification somewhat cyathiform, and of rare occurrence.

**Han.** Trunks of trees. Auchindenny woods.

Very smooth on the upper surface, and of a bright green colour, which changes in drying to a greenish grey. *Fructification* plentiful, scattered; the disk concave, at length plane, the border thicker in age.


**Han.** On trunks of trees, rocks, stone-walls, &c. common. Craigcrook, Colinton and Swanston woods, Maughan. Remarkably fine on old trees near Braid Hermitage.

This lichen adheres very closely to trees and rocks. The raised punctiform appearance, noticed in the character, is not invariably present, and towards the extremity of the lobes most usually wanting. *Colour* occasionally varying from dilute olive to deep olive brown. Sometimes in old age, the whole plant, but particularly the centre, has a densely pulvulent appearance.


**Han.** On rocks, walls and trees, very abundant.

A very distinct species, and conspicuous from its bright yellow colour.


**Han.** On rocks, common. Pentland Hills, very abundant.

A large species, frequently covering in an uninterrupted manner a large space of rock. *Lobes* densely imbricated, and very black beneath, with a close fibrous surface. *Fructification* in old age, turning black, having an inflexed border, which is more or less irregularly crenate. It is fond of exposed situations, and is thick and brittle.

8. *P. saxatilis*, orbicular, ash-coloured, roughish, pitted and reticulated, beneath black and fibrillose; lobes imbricated, waved, divided, plane, subretuse, dilated, rounded; fructification red-

**Hab.** On rocks, stones, walls and trees, very common. Abundant in fruit on the trees at Braid Hermitage, and on stones occasionally in the Pentland Hills.

Plant as large as the preceding, often widely spreading over large stones and branches of trees, in a most irregular manner. Lobes either narrow or broad, sinuous and multifid, truncate at the extremity and rolled back, rarely rounded. Upper surface reticulated with rough and elevated lines, with intermediate pits. In old age it becomes pulverulent and granulated. Fructification rather rare, large, and flexuose in an old state.


Plant rarely perfectly circular, but widely spreading, sometimes minutely dotted with black, turning blacker in age and pale in decay. Margin of the lobes not unfrequently eroded or lacerated. Fructification generally rare, but not unfrequent in this vicinity. It is difficult to procure good specimens of this lichen from its brittleness.


**Hab.** On rocks, Dunearn.

Plant between cartilaginous and membranaceous, dry, brittle, bearing hemispherical soredia of the same colour as the frond. Margin of the lobes reflexed, so as to render them subcylindrical. Disk of the fructification smooth, shining, the border narrow, but, from being inflexed, appearing thicker.


A distinctly marked species, of considerable size and pleasant colour; cracking in the centre with age, and becoming covered with a great number
of very minute lobes, mingled with pulverulent excrescences; not unfrequently the center cracks away, and leaves nothing but the foliaceous circumference. Fructification often plentiful, and distorted from mutual pressure.


Plant membraneous, cracking irregularly in the centre when old. Lobes radiating, and continued almost from the centre, linear, multifid, pruinose, closely adpressed; the fibrillae beneath straight, black, sharp and hispid. When this lichen is moistened, the bloom disappears, but returns on drying.


Hab. Trunks and branches of trees, common. Swanston wood, and elsewhere about Edinburgh, abundant.

An elegant lichen, submembraneous, very cinereous. Fructification having a neat appearance, from the contrast of the dark disk with the pale border. The student must not confound this with Borrera tenella, which is always distinguished by the segments being ciliated.


Hab. Rocks, stones, and trunks of trees. King's Park, Maughan.

Frond subcrustaceous, membraneous, orbicular; segments pinnatifid, sub-imbricated, plane and inciso-crenate at the extremities. Soredia hemispherical, white or glaucous, scattered over the whole surface. The fructification is rare.

15. P. cycloselis, orbicular, greenish grey, fibrous and black beneath; laciniæ imbricated, nearly plane, multifid, eroso-crenate, somewhat ciliate, the margin sometimes raised; fructification very dark, the border raised, entire. Ach. Syn. Lich. p. 216. Lichen cycloselis, Smith, E. B. t. 1942.

Hab. Trees, pales, walls. Top of the wall near Colinton, on the Edinburgh road.

Frond growing very close to the stone or bark, about an inch broad, of a
livid grey colour; segments numerous, narrow, with black scattered
cilia at the margin, which is generally more or less pulverulent.

**Lobes inflated at their extremities.**


**Hab.** On trees and rocks. Pentland Hills, Maughan. Swanston wood, in fructification.

This plant cannot be mistaken for any other. The lobes are much branched, linear, and swollen in a remarkable manner at the apex. Fructification more or less concave, sometimes large, with a thin inflexed border.

106. BORRERA. *Ach.*


**Hab.** On trees, sometimes on rocks. Auchindenny and Rosslyn woods Dalkeith; about Kirkliston.

Lobes or laciniae branched, entangled, ascending, ciliate at the extremity, with long black fibres. Fructification large, fixed by a thick central process to the ultimate lobes; in old age the margin becomes very irregularly fimbriate.

2. *B. tenella*, greyish white, naked, and of the same colour on both sides, substellate; lobes or laciniae pinnatifid, ascending, dilated, arched and ciliate at the extremity; fructification scattered, the disk plane, glaucous or pruinose, black, with an entire border. *Ach.* Syn. Lich. p. 221. *Smith*, E. B. t. 1351. *Hook.* Fl. Scot. 2. p. 56.


Circular and stellate, imbricated. The entire border of the fructification, much smaller in size, and (usually) pale coloured fibrile at the ends of the laciniae, serve to distinguish this lichen from any other native species.


**Hab.** On trunks of trees. Swanston wood.

Y 2
Cryptogamia. Lichenes. Cetraria.

Plant membranaceous. Laciniae arising from a common centre in a tufted manner, convex on the upper surface, rarely broad and nearly plane, covered with a grey farinaceous substance. Fructification rare, and not found in this neighbourhood.


Hab. Trunks of old trees and rocks. Pentland Hills, Maughan.

Plant membranaceous, very complicate, curled, and laciniate, whitish glaucous or greenish; laciniae broad or narrow, with sometimes a granular surface. Fructification not conspicuous, and of rare occurrence.


Hab. On the ground in subalpine countries. King's Park. Corstorphine; Dalmahoy; Pentland Hills, Maughan.

Lobes numerous, crowded, erect, and tufted; the edges either naked, or fringed with short teeth. In the recent state the base is often of a bright orange or red, but in drying turns to a greyish white. In maturity and old age the fructification (which is rare) is large and dilated.


Upper surface nearly smooth, somewhat shining, lacunose; beneath papulose, with little eminences, which are whitish, and the interstices villous and fuscous.


Hab. On rocks and the trunks of trees. Pentland Hills, Maughan.

Plant coriaceo-membranaceous; lobes very rounded and broad in the young state, and springing from a centre; afterwards spreading in a more irregular manner; the margin sometimes crisped, often pulverulent. Upper
Peltidea. Cryptogamia. Lichenes. 341

Surface impressed with scrobicular lacunæ or hollows, and bearing numerous small grey soredia. Fructification small and very rare.


Plant subrotund, inciso-lobate; lobes much rounded, flexuoso-plicate, sometimes with an inflexed margin; the pulverulent spots called soredia being most frequently confined to the edge or near it.


Hab. On the ground, or on moist rocks. Habbie's How, in the Pentland Hills, very rare.

This is a small and beautiful species, and cannot be mistaken for any other. It rarely exceeds an inch in diameter.


A large species, with great and widely-spreading lobes. Fructification terminal, very large in old age, transversely oblong, and generally revolute at the sides. Towards the margin of the lobes beneath, the surface is white, nearly naked, or but slightly veined.


Hab. On the ground, hedge-banks, roofs of old thatched cottages, &c.
common. In the same situations, but most common in such as are rather exposed.

*Plant* sometimes large; the surface appearing under the microscope as if formed of a web of slender fibrils. Underneath it is very white and beautifully reticulated with downy veins. *Fertile lobes* suberect, and reflexed, thus rendering them tubulosocanalicate. *Colour* varying from red to brown, or even black; the margin very thin, subentire or crenulate.


*Hab.* On the ground, wall-tops, particularly in subalpine countries. Wall at Craighouse, near Edinburgh.

*Frond* smooth and somewhat shining; the veins towards the extremities of the lobes of a dirty white. *Main lobes* rounded, the fertile lobules produced from the margin in a digitate manner, extremely numerous, long, narrow; the reflexed margins rendering them canaliculate beneath, or even almost tubular. *Fructification* rounded and reflexed in a similar manner.

110. **EVERNIA.** *Ach.*


*Hab.* Trunks of trees. Rosslyn and Colinton woods, Maughan. Auchindenny woods, Swanston wood.

*Plant* of a rather soft consistence, somewhat tufted, drooping. *Fructification* rare, generally marginal, always sessile at first, but less so, and very concave in age.

111. **CENOMYCE.** *Ach.*

*Plant* subcrustaceous, uniform. *Podetia*, subsimple, short, rarely bearing fructification. (*Pycnothelia.)*


*Hab.* On the ground, in moist heathy places. Drumshoreland Moor, Maughan.

*Plant* a granulated crust, the granules sometimes plane and imbricated. *Podetia* papilliform, swelling, generally barren, fragile, simple, or at most producing 2–3 short branches. *Whole plant* seldom half an inch in height.
** Plant foliaceous. - Podetia fistulose, expanding at the summit, and cup-bearing, or attenuated and subulate; cups closed with a membrane. **(Scyphophora.)

† Fructification brown or pale.


Plant cartilaginous, thickish, variously lacinate; laciniae sublinear, obscurely dentato-crenate at the margin, generally split at the extremity and inflexed.


Plants growing in broad tufts, composed of erect and densely crowded segments; segments narrow, glaucous green on one side, white on the other, and black at the base. The podetia seldom rise more than 2 or 3 lines above the segments. The fructiferous masses are minute, simple and sessile, rarely conglomerated.


Podetia in young plants, short, obconical; the base elongated in old plants, pulverulent, granular, subsquamose, pale or greyish. Cups large, campanulate, margin somewhat entire or dentate; fructification at first minute, afterwards larger, occasionally very large, always obscure brown. Except in old plants this species is not very frequently proliferous.


β. cornuta, podetia elongated, subulate, simple or branched,

**Hab.** Heaths on the ground, and among rocks and on old stumps of trees. Near Edinburgh, Sir J. E. Smith. Rosslyn and Auchindenny woods.

A more slender and taller plant than *C. pyxidata*, and the margin of the cups far more irregular, being in this species dentate, serrate, or frimbriate.


**Hab.** On the ground in heathy places. Pentland Hills, Sir J. E. Smith. Whole plant from half an inch to one inch in height, seldom naked, but rough and scabrous; scarcely any vestiges remain of the lower cups, but the summits of the *podetia* are deeply cleft and dilated in a cyathiform manner. The whole is obtuse, and the fructification subglobose and conglomerated, large when old.


**Hab.** Heaths, on the ground. Pentland Hills.

Plant subsimple, erect, crowded, and greyish-white in a young state, afterwards branched, but always filiform, greenish or greyish brown. *Cups*, when present, radiato-dentate at the margin, the fructification on the apices of the teeth, small and dark brown.

†† Fructification scarlet.


**Hab.** On the ground in heathy places, and stumps of old trees. Pentland Hills.

*Cups* large and irregular, digitate in a radiate manner, at length becoming almost obsolete, the *processes* more or less patent, and sometimes branched. Fructification placed on the digitate processes, minute, in very old specimens larger, and dark red.

9. *C. deformis*, foliaceous, minute, segments rather broad, cut, crenate, naked beneath; podetia long, thick, subventricose, sulphur-coloured, subpulverulent, cup-bearing; cups narrow,
CENOMYCE. CRYPTOGRAMIA. LICHENES. 345
_Hook._ Fl. Scot. 2. p. 63.

_Hab._ On the ground in heathy places. Pentland Hills, Maughan.

An irregular plant, from 1 to near 3 inches in height. From _C. coccifera_ it differs in the form of the cups; the fructification, the toothed margins, and in being dilated below the cups. _Podetia_ generally very thick, somewhat club-shaped, minutely pulverulent, very rarely cylindrical and scaly.

10. _C. coccifera_, foliaceous, segments minute, rounded, crenate, naked beneath; podetia elongato-turbinate, naked, rough with small warts, pale, greyish yellow or greenish, all cup-bearing; cups cylathiform, with spreading fertile margins; fructification large, at length podecilate. _Ach. Syn. Lich._ p. 269. _Smith, E. B. t. 2051._ _Hook._ Fl. Scot. 2. p. 63.

_β._ _cornucopoides_, podetia short, cup-shaped; cups dilated, crisped and foliaceous; fructification subpodecilate, at length prolificous.

_Hab._ On the ground in heathy places, and on banks and stumps of trees in alpine woods.

_Podetia_ much resembling those of _C. pyridata_, but somewhat longer, and the margin of the cups less dilated. _Colour_ pale yellowish; the surface pulverulent. _Fructification_ in a very old state sometimes blackish red.

11. _C. bellidiflora_, foliaceous, segments minute, inciso-crenate, naked beneath; podetia elongated, cylindrical, rigid, glabrous, foliaceo-squamose, pale, all cup-bearing; cups narrow, the margin fertile and prolificous; fructification crowded and conglomerate. _Ach. Syn. Lich._ p. 270. _Smith, E. B. t. 1894._ _Hook._ Fl. Scot. 2. p. 64.

_Hab._ On the ground in heathy and mountainous places. Pentland Hills.

_Podetia_ covered with beautiful foliaceous _eroso-crenulate_ scales; enlarging and swelling out in old age, and much elongated, from 1 to 3 inches in height. The bright red, large and conglomerate fructification, renders it very conspicuous.

*** _Plant_ foliaceous or scarcely so. _Podetia_ (in the dry state), cartilaginous, rigid, fistulose, all attenuated, subulate, branched, their axils generally perforated. (Cladonia.)


_Hab._ On heaths. Pentland Hills, Lightfoot North side of Orrock Hill.

Branches of the _podetia_ deflexed, curved, somewhat waved and ascending; ultimate and sterile ramuli forked. Little hook-like spines generally
occur on various parts of the podetia. Fructification subglobose, dilute brown.


Hab. On the ground in heathy places. Glassmont. Pentland Hills. A small plant scarcely more than an inch high, with very short, spreading, rigid branches; pale yellowish white. This species is, in this vicinity, pretty constant to its character.


Hab. On the ground in heathy places, abundant. Common on the Pentland Hills. This is the most common, and one of our largest species, being 3-6 inches in height. The stems are of a small diameter and cylindrical; the branches and branchlets rather short, not unfrequently subsecund. The drooping summits are an excellent character.


Hab. Heaths and banks in subalpine countries. Pentland Hills, rare. A very distinct species; larger than the following.


Hab. Rocks, stones, banks, &c. Rosslyn and Auchindenny woods. Braid Hermitage. Well distinguished from the preceding by the darker coloured crust and fructification.

113. *Isidium*. *Ach.*

1. *I. corallinum*, crust tartareous, at length cracking, greyish-white; podetia minute, varying in length, cylindrical, smooth,
114. STEREOCAULON. Schreb.


Hab. Rocks and on the ground in heathy places. Corstorphine and Pentland Hills, G. Don and E. Maughan.

The only species in Scotland. *St. botryosum* of Acharius scarcely differs from this species; at least I have found plants exactly intermediate, on the Pentland Hills.

115. SPHÆROPHORON. Pers.


Hab. On rocks and on the ground, in heathy and stony places. Pentland Hills.

From 1 to 3 inches high. Lateral branches remarkably attenuated.


This species forms a dense tuft. It is much and shortly branched, the branches glabrous and cylindrical; when sterile having their apex sub-acute; when fertile, incrassated, and terminating in the fructification. The whole plant is very brittle, in which it differs from the preceding species, as well as in its much smaller size.


Hab. Rocks in subalpine countries. Dunearn.

Somewhat intermediate between the two preceding species, but differing from both in the compressed frond. The branches are not unfrequently distichous. Fructification rare.
116. ALECTORIA. Ach.


Fructification rare, and very minute. Branches often much entangled, and the general appearance renders the common name which it has received of Mountain-hair very appropriate.

117. RAMALINA. Ach.


The largest species we possess of this genus (from 2 to near 12 inches in length), and subject to considerable variation. The branches or segments are sometimes expanded and broad, but always terminate more or less acutely; the rugose surface frequently assumes a reticulated appearance, as in some of the Stictae. Fructification sometimes very large.


Hab. Trunks of trees, frequent. Swanston wood; Colinton and Granton woods; Corstorphine Hill; Braid Hermitage, and elsewhere.

Growing in tufts, about an inch in height; the branches much crowded, incrassated upwards, and terminated by the plane or subconcave fructification, which is produced freely. Soredia (or naked powdery collections of sporules) have never been observed in this species.


Hab. On rocks near the sea. Caroline Park; Coast of Fife about Pettycur and Kirkcaldy; King's Park, and elsewhere.

Frond 1–2 inches high, tufted, very rigid, brittle, more or less warty or scabrous, sometimes gibbous. Fructification for the most part lateral, and elevated on short stalks, plane at first, then convex and reflexed. Taste bitter.

4. R. farinacea, frond between rounded and compressed, smooth, somewhat pitted, bearing soredia, rigid, branched,

Hab. On trees. About Edinburgh; Granton; Swanston, Corstorphine, Rosshlyn, and Auchindenny woods. Abundant.

This species varies, says Acharius, with simple or multifid branches, or in being variously fimbriate or proliferous. It also differs considerably in being slender or robust, suberect or pendulous, nearly naked, or thickly covered with soredia. Fructification very rare.

118. **CORNICULARIA.** *Ach.*


Hab. Mountains and heaths, on the ground. Pentland Hills, not unfrequent.

The whole plant is scarcely more than an inch high, much branched, the branches patent. It has a very prickly appearance, from the frequent, attenuated short ramuli, and the margin being fringed with subrigid short spines. Fructification obliquely peltate, inflated, with a radiate border.

119. **USNEA.** *Dill.*


Hab. On trees. Swanston wood, Maughan.

A fine lichen, of 2-4 inches in length, and, from its rigidity, suberect habit, thicker branches, horizontal fibrille, more frequent and larger fructification, distinguished from the following species.


Hab. On trees. Balmuto; Pentland Hills; Drumshoreland Muir.

It is very difficult to form an opinion respecting the species of this genus. Are the British ones actually distinct from each other?
120. COLLEMA. Hoffm.

* Plant imbricated, plaited, suborbicular, composed of minute lobes (which are thick and turgid in a moist state). (Enchylium).


*Hab.* On the ground, and on rocks, &c. Walls about Edinburgh, Maughan.

The different size of the central and external lobes is the most obvious character. Fructification in a young state often quite immersed. Colour varying, but generally more or less glaucous.


Gelatinous, black when dried; lacinate long and radiating, imbricated, depressed, and, from the margins being somewhat elevated, canalicate, very irregularly lobed, the lobes lacerate and crenate. Fructification when old reddish, and the disk dotted.

** Foliaceous; lobesmem branaceous, blackish-green. (Lathagrium).


*Hab.* Trunks of trees, and on rocks. About Edinburgh.

Somewhat gelatinous, membranaceous, rugose and plicate on both sides, subpellucid, divided more or less deeply at the circumference into rounded, entire and waved lobes. Fructification small, numerous, rather raised from the frond; in extreme age black.

*** Foliaceous; lobes rounded, membranaceous, thin, glaucous grey, subdiaphanous. Fructification subpedicellate. (Leplogium).


121. Lepraria. Ach.


Crust extremely light, yet forming dense masses, an inch broad, and half an inch thick, spreading irregularly over shaded rocks—Certainly not a Lepraria, but I confess myself at a loss to know what to do with it, as well as L. ceruginosa, Jolithus, and Chlorina.


Hab. Pillars of Rosslyn Chapel, Sir J. E. Smith. (It is abundant on the walls of the crypt).

Crust 2-3 lines thick, widely spreading on damp walls, from which it may be separated with facility. Filaments very obvious under a microscope, bearing masses of clustered granules—This and the preceding have a similar structure.


Hab. Rocks in shaded places. Arniston woods.

Crust of considerable thickness, and soft texture, surface uneven. A very doubtful lichen: indeed the whole genus requires revision, and microscopic examination.

4. L. flava, spreading, even, thin, slightly cracked, very bright yellow, composed of naked, subglobose granules. Ach.
XI. HYPOXYLA. De Cand. Grev.

I. PSEUDO-LICENES. Accompanied by a crust. Sporuliferous mass obscure or not spontaneously emitted.

122. OPEGRAHÀ. Pers.


Hab. On trunks of trees, common.

Crust very thin, smoothish, spreading irregularly in the clefts of the bark. Fructification without any peculiar direction.

2. O. notha, crust slightly cartilaginous, and somewhat pul-
verulent, white; fructification scattered without order, roundish or oval, the disk plane, at length convex, and almost obliterating the border. Ach. Syn. Lich. p. 76. Smith, E. B. t. 1890.

Hab. Trunks of trees. Rosslyn woods, and at Braid Hermitage.

This species is remarkable for the breadth of its disk, and narrow border. Crust very thin.


Hab. On the bark of trees, very common.

No plant can be better marked than the present one. It forms black, rough-looking irregular spots, nearly an inch in length.


Hab. On the smooth bark of trees, not frequent. Auchindenny woods.

The linear and parallel branches of the fructification of this species have long been compared to Hebrew or Chinese characters, which in truth they strongly resemble. Crust greenish or brownish-white, growing only on smooth bark (the hazel and holly being mostly preferred). Disk smooth, broad.—This belongs to the genus Graphis of Acharius, but the generic distinction is, in my opinion, too subtle.

123. VERRUCARIA. Pers.


Hab. Stones on the sea-coast. Islands of the Frith of Forth, and the coast in various places.

Crust widely spreading, without a regular margin, very thin, and full of minute cracks; not separable from the stone. Fructification a more or less imbedded tubercle.


Hab. On the bark of the common Birch. Swanston wood.

Crust spreading, without a margin, moist while on dead trees. Fructification minute black tubercles, the prominent portion convex-elliptical. In a variety on dead bark, they are extremely minute.

3. V. nitida, crust very thin, cartilaginous, olive-green or brownish, smooth; fructification numerous, hemispherical, some-

**Hab.** Trees. On hazel branches in Auchindenny wood.

The fine shining black tubercles of this species are very conspicuous. The crust has often a reddish tinge, especially when the fructification is abundant. It has been described as a *Spharia* by some authors.

124. PORINA. *Ach.*


**Hab.** On trunks of trees, frequent.

Crust thin, quite smooth. Warts of the same colour, smooth and somewhat polished, very prominent, sometimes almost conglomerated, marked with several minute, black orifices, communicating with as many spherules.

II. PSEUDO-Fungi. Destitute of a crust. Sporuliferous mass evident; often escaping spontaneously.

125. RHIZOMORPHA. *Roth.*


**Hab.** Between the bark and the wood of trees, especially Firs in decay. The whole year. Extremely common.

Various anastomosing, and forming a rude network, extending for several feet, and surrounding the tree beneath the bark. The breadth of the main branches is commonly 1-2 lines, but it sometimes is as much as 4-6. The young branches are reddish-brown, and subcylindrical.

2. R. *divergens*, stem pale reddish, cylindrical, subflexuose, never anastomosing; branches spreading in all directions, free; fructification clavate, regularly patent. *Clavaria phosphorea, Sow.* Fung. t. 100. ??

**Hab.** Between the bark and the wood of the stumps of felled Fir trees. Drumshoeland Muir. Autumn.

This, assuredly, is not the preceding, to which it bears no resemblance, either in the recent or the dried state. Fructification plentiful, about 2 lines long, arising from the branches at right angles, gently clavate, and pale at the apex; it is so abundant as to retain a quantity of soil or rotten wood, to remove which requires much patience. I do not think Sowerby's figure is the preceding species; nor am I convinced of its being the present one.

3. R. *farinacea*, long, straggling, remotely anastomosing, cylindrical, or subcompressed, white and pulverulent, reddish-brown within.

**Hab.** In very decayed stumps of trees which are partly filled with soil, or decomposed. The whole year. Braid Hermitage, &c.
The main stems very long, 1-1½ lines thick, growing as much in the soil as on the wood, sending out capillary branches, anastomosing very irregularly at intervals of many inches, flexible and coriaceous when recent, and easily broken, but, when dried, ligneous and unyielding. It requires care and patience to procure a good specimen, as the stems must be followed by removing the soil and decomposed wood.

126. XYLARIA. Hill.


Hab. On the stumps of decaying trees; gate-posts, &c. near the ground, common.

Extremely various in habit, simple or much branched, 1-3 inches long, acute at the apex, or dilated and laciniate. Sporules oval, small, in filiform tubes.

2. X. digitata, gregarious, somewhat tufted, black; peduncles glabrous, more or less united at their base; receptacle cylindrical, terminated by a sterile, acuminate apex. Spharia digitata, Pers. Syn. Fung. p. 6.

Hab. Rotten stumps of trees, frequent.

Whole plant 1-2 inches high, remarkable for the receptacle (or fertile portion) being placed intermediate between the base and apex. It does not always grow in a digitate manner, but often solitary. Sporules much larger than in the preceding.


Hab. Rotten stumps of old trees, not frequent. Slateford.

Variable in form; 2-3 inches high, suberose, white within, and, when divided, exhibiting the black spherules in a beautiful marginal row. Receptacle often half an inch thick, mostly obtuse at the apex.

127. STROMATOSPÆRIA. Grev.

*Receptacle free; (not bursting through the bark).


Receptacle 1-2 inches in diameter, an inch or more high, a part of the internal concentric lines whitish, but at length black and shining. Substance light and suberose.

2. St. deusta, large, pale and carnose, at length brownish-black and rigid, spreading, thick, undulato-rugose, the surface

_Hab._ On rotten stumps of fallen trees about Edinburgh, not frequent.

_Substance_ at first carnoso-coriaeous, whitish, pulverulent on the surface; when old, black and fragile. It is often 2 or 3 inches wide, and near half an inch thick, very unequal.


_Hab._ On dead branches, chiefly of hazel, common.

One to three lines broad, suberose, of a rusty brown colour, smooth, not shining, depressed, very rarely spherical.


_Hab._ On the decayed branches and trunks of trees, rare.

Two inches broad or more, 1–2 lines thick.—I have unfortunately mislaid the only specimens I gathered of this species, and can add no farther particulars.


_Hab._ On the dead stems of the larger herbaceous plants. About Edinburgh.

_Stria_ half a line to above a line long, parallel. _Spherules_ globose, apparently without orifices, and quite concealed within the receptacle.

6. _St. multiceps_, black, irregular, mostly free, but sometimes bursting through the bark, spreading, confluent, thickish, green within; mouths of the spherules obtuse, granulated, prominent. _Spharia multiceps_, Sow. Fung. t. 395.

_Hab._ On dead branches not unfrequent. Rosslyn and Auchindenny woods.

Forming coal-black, irregular masses, generally on the outside of the bark, about half a line to a line thick. The inside is always yellow-green. _Mouths_ of the _spherules_ more or less prominent, but varying.

** Receptacle bursting through the bark.

† _Orifices_ of the _spherules_ plane, or slightly prominent.

Stromatospheria. Cryptogam. Hypoxyla. 357

Hab. On dead branches of hazel, and other trees, not unfrequent.
Spreading, often quite round a branch, half a line thick, the surface smooth, cracked transversely. Mouths of the spherules nearly quite plane.


Hab. On dead branches of cherry, hazel, and other trees, not unfrequent.
Spreading much like the preceding, and often extending many inches, but always longitudinally, white within, half a line thick.


Hab. On wood, and dead trees; about Edinburgh.
Spreading in an irregular manner for two or three inches, of an opake, dull black; not united at first by a regular receptacle, but gradually acquiring a sort of crust.


Hab. On the fallen leaves of Elm trees, not unfrequent.
One to two lines broad, more or less round, depressed, dotted to the naked eye with the numerous, somewhat prominent orifices of the spherules, which are quite white within.


Hab. On dead branches of Beech, Hazel, and other trees, frequent.
One to two lines broad; greyish within. Spherules oblong, some of them never reaching the surface.

12. St. elliptica, scattered, gregarious, rather large, elliptical, rusty-brown, smooth, minutely pulverulent, blackish and friable within; mouths of the spherules quite concealed.

Hab. On dead branches of Birch trees, rare. Swanston wood.
Three to five lines long, acute at each end, bursting transversely through the bark, convex, and rather turgid, quite even or slightly granulated with the concealed spherules.—A very distinct species.

**CBDALGAM. HYPOXYLA. STROMATOSPHERIA.**

**Hab.** On the dead stems and branches of the Red Currant, frequent.

Half a line to near two lines in length, somewhat elevated, but with the surface nearly plane or depressed, and more or less transversely and irregularly furrowed. *Spherules* white within.

14. St. *nigro-annulata*, gregarious, distinct, bursting through the bark, which is marked with a narrow black ring; disk small, covered by an evanescent membrane, beneath white, pulverulent, dotted with the black orifices of the immersed spherules.

**Hab.** On the dead branches of the Common Lime tree; not frequent.

A beautiful species, of a depressed, conical figure, truncate at the apex, and splitting the bark into 2-3 acute laciniae. The black ring which surrounds the base is about a line and a half in diameter.

†† *Orifices of the spherules more or less spinose.*


**Hab.** On the dead branches of the Oak and White Thorn. Common.

Small, not a line in diameter, prominent, whitish, splitting the bark transversely. *Orifices of the spherules* sometimes only papillose.


**Hab.** On dead branches of the Sloe (*Prunus spinosus*), not unfrequent.

Two to four lines long, one to near two lines broad, exhibiting a very dense, even mass of rather blunt spinous orifices.


**Hab.** On dead Oak branches, occasionally.

Very gregarious, distinct, but often almost contiguous, 1-2 lines broad, nearly a line high, whitish within. *Orifices of the spherules* varying in length.


**Hab.** On the decayed branches of Hazel, frequent.

One to three lines long, sometimes nearly round. *Orifices* unequal in length, either crowded or piercing the receptacle in a scattered manner.

19. St. *corniculata*, receptacle very small, black, spherules few, crowded with thickish, cylindrical, elongated, obtuse, co-
arctate orifices, umbilicate at their apex, and piercing the bark

Har. On dead branches of various trees, not unfrequent.

Concealed beneath the bark, except the orifices, which are considerably ex-
serted. Orifices pretty constantly umbilicate at the apex.

128. CUCURBITARIA. Gray.

1. C. Berberidis, black, elliptical-oblong, bursting longitudi-
nally through the bark; spherules seated on the receptacle,
crowded, rugose, somewhat tesselated. Grev. Crypt. Fl. t. 84.

Har. On the dead stems and branches of the Common Berberry.

One to three lines long, acute at each extremity. Spherules round, without
an orifice, white within.

2. C. pinastri; clustered; spherules globose, dotted, red, at
length black, at first immersed in the receptacle; tubes contain-
ing the sporules attenuated at each extremity. Grev. Crypt.
Fl. t. 50.

Har. Dead branches of Spruce Fir. Rosslyn woods.

Gregarious, very numerous, a line broad. Spherules at first immersed in
the receptacle, at length more or less seated on its surface, irregularly
clustered, the mouth very minute, and somewhat papilliform.

3. C. coccinea, very gregarious; spherules minute, clustered,
scarlet, oval, irregular in size, smooth, the mouth papilliform.
p. 7.

Har. On the dead branches of various trees, frequent.

Varying much in size, being sometimes above a line broad, at others mere-
ly consisting of the receptacle and two or three spherules. The fine co-
lor, ovate form, and smooth surface of the spherules, distinguish the
species.

4. C. decolorans, dull pale red; scattered or crowded on the
receptacle; spherules globose, tuberculated and rugose. Spha-
Sph. fragiformis, Sow. Fung. t. 256.

Har. On dead branches of various trees, frequent.

One to two lines broad, elevated. Spherules larger than in the preceding,
well distinguished by their rugose surface.

129. CRYPTOSPHERIA. Grev.

* Spherules collected into circular clusters.

1. Cr. faginea, black; spherules few, the mouths elongated,

Har. On dead branches of Beech trees, not unfrequent.

Small. Spherules usually 4-8, the elongated mouths curved upwards ra-
 ther suddenly, and protruded through the bark.

**HAB.** On dead trunks and branches of the Birch tree, and Wild Cherry.

Two lines to above half an inch broad. *Spherules* globose, somewhat shining, with their mouths long in proportion to the breadth of the cluster. *Mouths* depressed, but ascending at the apex, and sometimes piercing the bark.

**Spherules more or less scattered, or simply aggregated.**

† *Spherules with an orifice.*


**HAB.** On Hazel leaves while yet green, occasionally.

*Spherules* minute, about a dozen growing together, sometimes in an irregular circle, producing a yellow spot on the leaves.

4. Cr. *acuta*, black, shining, very numerous, ovate-conical, the mouth short, thick, cylindrical, piercing the epidermis like a black point; after the decay of the epidermis, the spherules are naked. *Spharia acuta*, *Pers. Syn. Fung.* p. 62.

**HAB.** On dead stalks of Nettles, rarely on other large herbaceous plants.

Almost invisible while the epidermis remains, but afterwards the spherules are exposed, very numerous, almost crowded, acute to the naked eye, very harsh to the touch, and many resembling large-bellied bottles in miniature.

5. Cr. *millepunctata*, spherules black, minute, very numerous, globose, white within, immersed in the substance of the bark, the mouth very short, scarcely piercing the epidermis, which seems covered with innumerable black dots.

**HAB.** On dead branches of the Ash tree, frequent.

Nothing is visible of this species to the naked eye, but the black dots on the epidermis. The spherules, which are in the substance of the bark, fall with it.


**HAB.** On dead leaves of the Yew and Silver Fir; frequent.

*Spherules* 4–8 on a leaf, forming a line on each side the midrib, the orifice very obtuse, and piercing either side of the leaf indifferently.

Cryptosphaeria. Cryptogam. Hypoxyla. 361

Very irregular, mostly oblong, the surface uneven. Orifice dubious.

8. Cr. Lauri, scattered, rather minute, plano-convex, blackish, splitting the epidermis in the centre, and becoming umbilicated; sporules naked, very minute. Spharia Lauri, Sow. Fung. t. 371. f. 4.

Scattered over the whole leaf, half a line broad, circular, rather prominent, the epidermis so closely attached and transparent as to seem a part of the plant, but splitting at the apex into 2-4 laciniæ.

9. Cr.? bifrons, scattered, black, shining, plane, the margin slightly raised, the epidermis united with the plant, and bursting at the centre into 3-5 acute segments; sporules naked, oblong, in 3-5 distinct masses. Spharia bifrons, Sow. Fung. t. 316.

Har. On dead leaves of the Holly.
About three-fourths of a line broad, occupying the whole substance of the leaf, and the epidermis of each side appearing as if incorporated with it. The interior is solid, dark brown, the centre containing mostly three ovate masses of sporules, which escape generally by the upper, but often by the under, surface.


Sporules succulent; mouths papilliform, penetrating a filamentous stratum.

11. Cr. Tamariscinis, scattered, under the epidermis, which is very convex and ruptured in the centre; mouth very short, obtuse, not exserted; sporules oval, in filiform tubes. Grev. Crypt. Fl. t. 45.

Har. On the dead branches of Tamarix germanica, in the garden of David Falconer, Esq. Carlowrie.
Sporules globose slightly depressed, their black colour appearing through the epidermis.

12. Cr. semi-immersa, scattered, globose, with a very short, rounded, umbilicated mouth; at first the mouth only visible, at length the spherule itself semi-exserted, falling out in decay, and leaving a cavity. Spharia semi-immersa, Pers. in litt.

Unequally scattered, black, shining, the older spherules intermixed with the young ones, the latter appearing like mere dots.

13. Cr. Herbarum, spherules minutæ, scattered, very numerous, black, round, depressed, orifice papilliform, piercing the
CRYPTOGAM. HYPOXYLA. Cryptospheria.


HAB. On the dead stalks of large herbaceous plants, especially on the Umbelliferae; very common.

Minute, very gregarious, mostly round, sometimes oval, depressed, often almost plane, the orifice very small.


HAB. On the stalks of large herbaceous plants, as various Lilies, Day-lilies, &c.; frequent.

Spots half an inch long or more, 2-3 lines broad, forming a grey ground on which the orifices of the spherules appear like deep black scattered dots.

†† Spherules without an evident orifice.

15. Cr. capillata, parasitic on the leaves of dead grasses; scattered, brown-black, white within, flatly hemispherical, the apex furnished with a tuft of black, rigid, diverging hairs. Grev. Crypt. Fl. t. 69. Spharia capillata. Nees, Syst. t. 43. f. 346.

HAB. On the dead leaves of Holcus mollis. Auchindenny woods.

Very minute, but the black tufts of bristly hairs quite obvious, being one-third of a line broad.


HAB. On the leaves of Egoopodium Podagaria, while yet green, frequent. Spherules of unequal size, rugose under the microscope, black and somewhat shining.


HAB. On dead Oak, Ivy, and other leaves; frequent.

Very numerous, generally producing white spots on the leaf, collapsing. The var. on Ivy leaves (which may prove distinct) is larger, and often dehiscent, besides the leaf being of an uniform colour.

18. Cr. microscopica, excessively minute, very gregarious, so as to form dark cloud-like irregular spots on the leaf.


Finely punctiform. Cloud-like spots at first circular, at length confluent, the spherules very crowded, shining.

19. Cr. glauco-punctata, spherules very numerous, punctiform, glaucous or blueish-black, rendering the leaf pale.

HAB. On dead leaves of Ruscus aculeatus. Slateford.
Spherules very minute, rendering the leaf somewhat clouded; under the microscope shining, somewhat dehiscent, and with a white point in the centre.

20. Cr. nitida, punctiform, black, collected into small groups, prominent, convex, very shining.

**Hab.** On living leaves of Geranium robertianum. Not unfrequent about Edinburgh.

Scarcely appearing to be of this genus at first sight, but the epidermis really surrounds the spherules, and is closely united to them. Under a pocket-lens, the highly polished spherules are very striking.

130. **SPHÆRIA.** Haller.

* Spherules with an orifice.

† Spherules not hairy.


**Hab.** On rotten wood, not unfrequent.

Spherules opaque, black, usually excessively crowded. Sporules oblong, escaping in the form of a white powder.


**Hab.** On dead, rather dry wood, frequent.

Spherules growing in very irregular clusters, extremely minute, brittle.


**Hab.** On dead stalks of large herbaceous plants, especially the Umbelliferae.

Spherules scattered, or so crowded as to be contiguous, somewhat conical, the mouth round, papilliform.


**Hab.** On the dead stalks of large herbaceous plants, chiefly the Umbelliferae, after the epidermis has been removed.

Spherules attached by the whole base, elevated, somewhat shining, remarkably concave from colapsion.—This plant scarcely belongs to the genus; the sporuliferous tubes within are erect and fixed.

†† Spherules hairy, or arising from a hairy stratum.

5. S. byssiseda, rather large, brownish-black, shining, globose, with a papilliform orifice, arising from a dense, brown, filamen-

**Hab.** On dead branches of trees. Abercorn Park, Duddingston.

Filamentous stratum, widely spreading, Spherules numerous, often very crowded, nearly a line in diameter.


**Hab.** On dead branches, wood, &c. Rosslyn woods.

Spherules small, the hairs short, black, shining, appearing to be disposed in fasciculi.


**Hab.** On dry rotten branches and dead stalks of large herbaceous plants. Auchindenny woods.

Spherules somewhat depressed, sessile on rather a broad base; when young covered with hairs, the upper half becoming quite naked.


**Hab.** On decaying large fungi. On the pileus of *Polyporus squamosus*, Newliston woods, Messrs Wauch and Greville.

Spherules very minute, smooth, densely crowded into clusters several lines broad, and spreading irregularly. Spherules in filiform, hyaline tubes. **

**Spherules without an evident orifice.**


**Hab.** On dead wood and decayed branches, not unfrequent.

Spherules often contiguous, and arranged in lines, at other times more generally scattered, of different sizes, very rugose.


**Hab.** On dead *Polyporus abietinus*, rare. Carlowrie.
Spherules globose or oval, so rugose as to be almost tesselated. Sporules subglobose, in filiform hyaline tubes.


**Hab.** On dead, dry wood, frequent.

Spherules minute, very black, seed-like, generally so crowded as to be contiguous.

### 131. **POLYSTIGMA.** Pers.


**Hab.** On the living leaves of *Prunus spinosa*. Auchindenny woods.

Two to four lines broad, plane, somewhat carnose, of an irregular form, the surface dotted with the orifices of the fructification.


**Hab.** On the culms of living grasses, occasionally.

Investing the culms of grasses for half an inch or more, carnose, pale at first, at length yellow, the surface slightly granulated.

### 132. **NÆMASPORA.** Pers.

1. *N. Carpini*, spherules depressed, black, immersed, sporules large, ovate, escaping in the form of thick, black tendrils. **Sow. Fung.** t. 376.

**Hab.** On dead branches of Hornbeam, Sycamore, and other trees. **Carrowrie.**

Tendrils irregular, large, often nearly an inch long. Sporules dark-coloured under a high power of the microscope.

2. *N. filamentosa*, spherules very small, grey-black; sporules excessively minute, dust-like under a high magnifying power, escaping in the form of long, capillary, entangled, dull orange tendrils.

**Hab.** On dead branches. About Edinburgh.

Tendrils half an inch long or more, slender, tortuous, tenacious. Sporules pale yellowish when highly magnified.

3. *N. Rosarum*, spherules waved when divided horizontally, elevating the epidermis, orifice blackish, with a cottony margin; sporules very minute, forming a single, short, slightly tortuous whitish tendril. **Grev. Crypt. Fl.** t. 20.

**Hab.** On dead branches of most Roses; frequent.

Minute, slightly prominent, somewhat regularly scattered. Spherules black-

ish-brown. Sporules under a high magnifying power dust-like, and almost colourless.

133. PHACIDIUM. Fries.


Hab. On dead Oak and Beech leaves in woods, frequent. Scattered, at first resembling a plane black circular spot, nearly a line broad; at length bursting in the centre, the segments becoming erect and slightly revolute. In dry weather it is generally closed.


Hab. On Oak leaves in woods. Rosslyn woods. White spots on the leaf, about a quarter of an inch broad, on which 3–6 plants are scattered, much smaller than the preceding.

134. STILBOSPORA. Hoffm.


Hab. Mostly on dead branches of Beech, but also on various other trees, not unfrequent. Scattered, black, bursting through the bark, somewhat tuberculated.

2. St. biloculara, black, roundish, bursting through the bark; sporules ovate, obtuse, 2-celled.

Hab. On dead branches of Furze (Ulex europaeus), frequent. Scattered, sometimes crowded, dull black, raised, the surface plano-convex.

135. HYSTERIUM. Pers.


Hab. On dead Oak branches, frequent. Auchindenny and Rosslyn woods. Gregarious, bursting through the bark in no particular direction, 2–3 lines long.


Hab. On the rugged bark chiefly of Oak trees. Braid Hermitage. At first sight resembling an Opegrapha, but there is no crust; very gregarious, lying on the bark in all directions. Sporuliferous tubes clavate, con-
taining 3–4 yellow, narrow, pyriform bodies, divided by several articulations.


**Hab.** On dead wood and stumps of trees where the bark has fallen; rare. Slateford.

Minute, very narrow, 1–2 lines long, growing in a longitudinal direction. Substance rather soft.


**Hab.** On dead Ash branches, frequent. Slateford, Craigmillar, &c.

At first bursting through the bark, at length naked, corneous, obtuse. Sporules 6–8 in clavate tubes.


**Hab.** On dead leaves of various species of Fir, but chiefly the Scotch Fir. Very common. Scattered, growing longitudinally on each side the leaf, scarcely a line long. black. Sporules oblong, minute.


**Hab.** On dead leaves of the common Juniper. Pentland Hills. Regularly oval, parallel with the nerve of the leaf, the dehiscence not extending to the extremities.


**Hab.** On the dead leaves and culms of various grasses, common. Gregarious, growing longitudinally and parallel, oblong or linear elliptical. Sporuliferous tubes few.

136. XYLOMA. *Pers.*

* Large, compound, confluent.


**Hab.** On living leaves of the sycamore. (*Acer pseudo-platanus*), very common.

Spots from one-fourth to above half an inch broad, quite black, the surface rugose, marked in age with gyruse lines. *Porihecia* contiguous, varying in form, mostly linear-flexuose, not always bursting.

**Hab.** On living leaves of *Salix caprea*, not common. Rosslyn woods.

*Spots* very thick, solid, firm, from one-fourth to half an inch broad, of no regular form, somewhat shining, the surface unequally rugose.

** Small, mostly punctiform, distinct, gregarious.**


**Hab.** On decaying leaves of *Salix caprea*, not unfrequently; Rosslyn woods.

*Spots* about one-third, rarely half a line broad, at first pale yellowish-brown.


**Hab.** On the leaves of the aspen, not common. Near Kirkliston.

Brownish at first, at length opaque black, of no regular form, nearly a line broad.

5. **X. Geranii**, scattered, black, unequal in size, plane, the surface rugose, and somewhat papillose in the centre.

**Hab.** On the living leaves of *Geranium sylvaticum*. Auchindenny woods.

From half a line to a line broad, dull black, rarely crowded.


**Hab.** On dead leaves of the beech, (*Fagus Sylvaticus*). About Edinburgh. Balmuto.

Extremely minute, quite black, very shining under a pocket magnifier, the centre depressed.


**Hab.** On the living leaves of *Alnus glutinosus*, rather rare. Rosslyn and Auchindenny woods.

Punctiform, regularly distributed mostly over the whole leaf, without any disposition to become crowded in particular parts.


**Hab.** On dead leaves of the holly, very common.

About one-fourth of a line broad, roundish, the upper half at length separating, and the lower one becoming concave after the escape of the spores.

137. **ASTEROMA. De Cond.**

1. **A. Ulmi**, filaments black, radiating, subdichotomous, at
length covered with confluent, rugoso-plicate, shining black tubercles.

_Hab._ On living leaves of the different species of elm. Not unfrequent. From 1–3 lines broad, the filaments distinct at the circumference, their branches divaricating.

2. _A. Alchemilla_, filaments very minute, extremely fine, branched; at length bearing subdistinct black tubercles; producing a pale spot on the leaf.

_Hab._ On living leaves of _Alchemilla vulgaris_. Auchindenny woods.

One or two lines broad. Filaments so fine as often to be almost invisible to the naked eye, previous to the production of the tubercles. The pale on the leaf is the best guide to it.

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**XII. FUNGI. Link. Grev.**

_Div. I._ **Plants with a pileus or cap; hymenium on the under surface, in the form of straight, simple lamellae, (gills,) (Agaricoideae).**

138. **AMANITA.** _Dill_.


_Hab._ Borders of woods, in autumn. Swanston wood, &c.

It is not surprising that this splendid fungus should have received the name of _Imperialis_ from Batsch, for there is no one which so well deserves pre-eminence. The pileus varies occasionally in colour, from blood-red to orange, whitish and brown; 3–7 inches broad, fleshy, convex, at length nearly plane. Lamellae white, broad. Stipes 4–9 inches high, ½–1 inch thick; white, or pinkish, solid, or with a slight cavity, bulbous. Veil in the form of a deflexed collar.

139. **AGARICUS.**

_Series I._ Veil variously formed, or none. Lamellae not changing colour, mostly white. Sporules white. (Leucosporus, _Fries_.)

A. Furnished with a veil.

_Sect. 1._ (Lepiota, _Pers._)

Veil general, forming a subpersistent annulus. Stipes subsolid or filled with a fibrous mass, the surface fibrillose. Pileus more or less fleshy, ovate, becoming campanulate, at length spreading and umbonate. Lamellae unequal, white, in a few varieties sometimes yellow.—Solitary fungi* growing on the ground, not speedily decaying.

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* One species _Ag. melleus_, is an exception, and grows often in dense clusters, though sometimes single; and _Ag. granulosus_ is occasionally found growing 2 or 3 together from the same root.

Hab. In open woods, in autumn. About Rosslyn, Carlowrie, &c.

Pileus 3-7 inches broad, spreading, broadly umbonate, dingy white, with dark scurfy scales formed out of the epidermis. Lamellæ distant, white. Stipes long, cylindrical, firm, half an inch thick, somewhat scaly, hollow, but filled with a silky fibrous mass. Annulus free, thicker at its lower margin.

A very fine Agaric, with a good deal of the habit of an Amanita. In some of the Highland birch woods it grows in prodigious abundance.


Hab. In woods, borders of shaded fields. Duddingston, rare.

Pileus 1-2½ inches broad, whitish, with reddish scales, umbonate. Lamellæ white, free, very numerous. Stipes 2-3 lines thick, 2-3 inches long, whitish or pale brownish, covered, more or less, with minute evanescent woolly scales, somewhat bulbous at the base. Collar generally vanishing. Whole plant without taste or smell.

Bearing some resemblance to Ag. procerus, but smaller and more delicate. It varies much in size. The annulus is sometimes very fugitive, but I have also seen it persistent, and even free, as in Ag. procerus.


Hab. In bare places in woods, orchards, &c. At Foxhall, near the river side, Captain Wauch. Garden at Millburn. Autumn.

Much smaller than the preceding. Pileus ½-1½ inches across, white, umbonate, epidermis collected into reddish, and often revolute scales. Lamellæ white, rather numerous, free. Stipes 1½ inches high, scarcely 2 lines thick, silvery white or pale reddish, smooth. Collar fugacious. Taste and smell strong and ungrateful.


Pileus convex, becoming nearly plane, reddish-yellow, rough with scales, sometimes smooth in the centre, ½-1½ inches broad, obtusely umbonate, Lamellæ yellowish-white, adnate with the stipes, numerous. Stipes 2-3 lines thick, 2-3 inches high, nearly straight, firm, substilouose at the top, and somewhat thicker at the base, rough from the annulus downwards with squarrose, brownish scales.—Growing sometimes in small clusters of 3 or 4 together, but generally single and scattered.

Hab. At the roots of old trees, particularly such as have been felled, and sometimes singly on the ground in woods. Woods at Carlowrie and Newliston. Balmuto, growing gregariously in an open field. Autumn.

*Pileus* spreading, margin mostly rounded and substriate, umbonate, 2–6 inches broad, brownish-yellow, dingy olive, or reddish-brown, rough and almost bristly with scales of fasciculated black hairs. *Lamella* dingy white, becoming tinged with red, more or less decurrent, and sometimes forming regular streaks on the stipes down to the collar. *Flesh* rather thick white. *Stipes* 3–6 inches long, half an inch or more thick, firm, solid, somewhat incrassated at the base, generally whitish, or with a reddish tinge, fibrillose or slightly scaly. *Collar* large, persistent, spreading. *Sporules* very numerous.

**Sect. 2. (Limacium, Fries.)**

*Veil* general, slimy, thin, extremely fugacious. *Stipes* firm, solid, or filled with a spongy mass, somewhat scaly or spotted. *Pileus* fleshy, convex, becoming more or less plane, firm, very slimy when young. *Flesh* white. *Lamellae* always adnate with the stipes and decurrent, thickish, distant, unequal, white.—Fungi of a moderate size, solitary, growing on the ground, autumnal, not quickly decaying.


*Pileus* white, smooth, slimy when young and in wet weather, shining when dry, 1–2 inches broad, more or less umbonate, the margin turning up in age. *Lamellae* distant, white, thick, very decurrent, broad. *Stipes* 1–3 inches high, slightly crooked, firm, scurfy or nearly smooth, often attenuated at the base, solid, becoming hollow in age.

**Sect. 3. (Tricholoma, Fries.)**

*Veil* very fugacious, partial, fibrillose or floccose. *Stipes* fleshy, firm, scaly, fibrillose, or with the fibres so arranged as to produce a striated appearance. *Pileus* fleshy, either compact, hemispherical, at length spreading, rounded, &c. thinner and campanulate white young; margin thin, at first inflexed, and united with the veil. *Lamellae* unequal, juiceless, posteriorly obtuse.—Large fungi, remaining a considerable time, solitary or gregarious, mostly growing on the ground. Many are esculent.

Hab. In woods, on the ground about the rocks or stumps of felled trees, particularly firs. Swanston wood, and on Dundas Hill, in autumn.

Pileus convex, rarely becoming quite plane, 2-5 inches broad, fleshy, but not hard, purplish or crimson-red at first, but as the epidermis separates, becoming partly of a deep yellow, with the woolly coloured remains of the epidermis scattered over it. Lamellae numerous, broad, yellow, thickish, partly adnate with the stipes. Flesh yellow, rather spongy. Stipes firm, unequal, incassated at the base, solid, rarely hollow, ½-4 inches high, ½-3 of an inch thick, yellow, variegated with red.

B. Stipes destitute of a veil.

Sect. 4. (Russula, Pers.)

Veil none. Stipes equal, smooth, firm, spongy within. Pileus with a fleshy disk and thin margin, hemispherical, becoming plane, with the centre depressed; epidermis sometimes viscidous. Margin only involute in the youngest state. Flesh firm, juiceless, white, with a subvesicular structure. Lamellae juiceless, either entirely equal, or with short ones intermixed, sometimes forked, thickish, somewhat rigid, yet brittle, sometimes appearing decurrent, from the stipes expanding into the pileus. Sporules occasionally yellowish.—Rather large fungi, rigid, remaining a considerable time, solitary, on the ground, chiefly occurring towards the end of summer. Colour of the pileus various.


Hab. In woods, pretty common. Dundas Hill. Autumn.

Pileus somewhat fleshy, convex, becoming nearly plane, margin very thin, 1-2 inches broad, colour various, mostly yellow, with an occasional tinge of purple. Flesh white, spongy. Lamellae subdistant, yellow, regularly equal, connected by veins. Stipes 1-½ inches long, white or yellowish, solid, spongy. Taste not acrid, but rather nauseous.


Hab. In woods, and under trees in various situations, extremely common from summer to the beginning of winter.

Pileus 2-5 inches broad, glutinous when young, smooth, hemispherical, at length plane, depressed in the centre, margin thin, striato-sulcate, of a great variety of colours, purple, rose-red, blueish, fuscous, yellow, or even white. Lamellae subdistant, broad, rigid, thickish, connected together by small threads or veins, intermixed with a very few smaller lamellae, always white. Stipes 2-3 inches high, firm, solid, white, or tinged with the colour of the pileus. Taste acrid.

10. Ag. adustus, large, pileus depressed, ash-coloured-olive, at length dark, and as if burnt, margin smooth; lamellae unequal, distant, white, thick; stipes short, solid, very robust.

*Ag. elephantinus*, pileus yellowish-brown; lamellae yellowish-white; stipes solid, white. *Ag. elephantinus*, Sow. Fung. t. 36.

Hook. Fl. Scot. 2. p. 60.


Pileus large, inelegant, 4-7 inches broad, rather pale when young, and glutinous, becoming yellowish dingy brown and cracking, at length blackish, as if it had been exposed to fire. Flesh white, sometimes changing, on being broken, to a reddish or blackish colour. Lamellae very distant and thick, dingy white. Stipes 2-3 inches high, 2 inches thick, dirty white.

**Sect. 5. (Galorrheus, Fries. Lactifluus, Pers.)**

Veil none. Stipes naked, equal, cylindrical, firm, expanding into the pileus. Pileus fleshy, firm, plano-depressed, umbilicate, margin smooth or tomentose, involute when young. Flesh firm, juicy. Lamellae lactescent, unequal, often forked, narrow, adnate and decurrent. Large or moderately sized fungi, solitary, growing on the ground, firm, lasting some time, aromatic, of an acrid taste, found in summer and autumn. The stipes as well as the pileus is generally lactescent; but individuals of various species sometimes occur entirely without juice.

*Margin of the pileus involute, tomentose, (poisonous).*


Hab. In woods, thickets, borders of fields, &c. in summer and autumn. Dundas Hill, and probably in many other places.

Pileus 2-5 inches broad, pale, brownish, glutinous or dry, convex, becoming depressed, and often hollowed, very tomentose or fibrillose at the involute margin. Lamellae whitish or with a tinge of red, numerous. Flesh white. Stipes solid, scarcely central, yellowish-white, about 2 inches high. The juice is white like milk, and does not change colour, extremely acrid.

Highly poisonous. Dr Withering correctly ascertained this to be the *piperatus* of Linnaeus.


Hab. In woods, or in grassy places under large trees. Braid Hermitage, in autumn.

Pileus depressed, margin rounded, involute, 2-4 inches broad, reddish-buff, sometimes glutinous, very tomentose, becoming fibrillose at the margin. Lamellae yellowish, irregular and often branching, apparently decurrent, from the expansion of the stipes into the substance of the pileus. Flesh yellowish-white, darker towards the surface. Stipes about 2 inches high,
near 1 in diameter, dingy white, yellow, or brown. No juice, but there is considerable moisture on the surface of the pileus, which seems to originate from the plant.

** Pileus glabrous, glutinous, marginated. (Acrid but edible.)


Pileus 2-4 inches broad, plano-depressed, sometimes approaching towards funnel-shaped, orange or reddish, becoming dingy pale, and in decay greenish, glutinous, smooth, obscurely zoned. Lamellae apparently decurrent, bright reddish orange, frequently but not regularly dichotomous, narrow, turning green on being wounded. Flesh pale orange. Stipes solid, becoming hollow, about 2 inches high, orange, somewhat attenuated at the base. The whole plant is exceedingly juicy, and exudes an orange milky fluid on being injured. It is more or less acrid, but much esteemed.

*** Pileus not glutinous, margin naked. (More or less acrid. Subdulcis and plumbeus have been eaten.)


Pileus 1-3 inches broad, convex, becoming depressed, at length often approaching to funnel-shaped, sometimes umbonate, margin rounded, somewhat involute, compact, buffish red, often obscurely zoned, very regular in form. Lamellae numerous, pale buff; becoming reddish, decurrent. Stipes about 2 inches high, longer in peculiar situations, cylindrical, thickish, buff, often tinged or streaked with red, straight or slightly crooked, firm, becoming hollow in age.

Taste mild at first, rather nauseous afterwards, and sometimes, though rarely, acrid.


Hab. In woods; Dundas Hill. According to Fries, often in moist places among Polytricha. Autumn, rare.

Pileus large, 3-5 inches broad, convex, becoming depressed, firm, never zoned or glutinous, margin mostly involute, dark fuliginous grey or brown. Flesh compact, white. Lamellae numerous, yellowish, varying
with different shades. Stipes 2-3 inches long, firm, thick, brownish or dingy olive.


Pileus 3-6 inches broad, not glutinous, white or yellowish, margin deflexed, involute, “generally set sloping on the stipes,” (With.); smooth. Lamellæ very crowded, straight, very narrow, linear, repeatedly dichotomous, white or yellowish. Stipes scarcely 2 inches high, 1 thick or more, smooth, very firm, whitish. Juice very abundant, and excessively acid and bitter. It is nevertheless edible, according to Fries.

This plant is sometimes monstrous, and irregular; Withering mentions their attaining the diameter of 10 inches. The stipes is not infrequently thicker than it is long. It has been used in medicine, and thought useful in dissolving calculi,—a property we may safely venture to deny it.

Sect. 6. (Clitocybe, *Fries*. Part of Gymnopus and *Omphalia*, *Pers.*)

Veil none. Stipes equal or attenuated above, not bulbous, smooth, tolerably firm. Pileus more or less fleshy, either continuing convex, or becoming depressed, and sometimes at length infundibuliform. Lamellæ unequal, juiceless, not changing colour, tenacious, variously fixed or free. Sporules white. Colour various.—Large or moderate sized fungi.

* Pileus dry, smooth. Lamellæ numerous, decurrent or attenuato-adnate.


Pileus 4-12 inches broad, broadly funnel-shaped, rarely lobed, whitish, Flesh white, thin for the size of the plant. Lamellæ numerous, decurrent, white, becoming reddish. Stipes about 2 or 3 inches high, very thick and firm, similar in colour to the pileus.

This is one of those species which form those circles known by the name of Fairy Rings, the origin of which is still as obscure as ever.


Pileus compact, 3-4 inches broad, “moist, but not glutinous,” (Fries.) smooth, margin involute, yellowish-white or pale reddish, umbonate. Lamellæ numerous, narrow, pale, sometimes branched, decurrent. Stipes 2-6 inches long, ¼ to ⅜ of an inch thick, cylindrical, firm, somewhat incrass-
sated at the base, solid, the same colour as the pileus, subradicating, (penetrating somewhat into the ground).


_Hab._ In moist woods, among dead leaves. Foxhall, Hallyards and Newliston woods, Captain Wathe. Woods at Carlowrie. Autumn.

_Pileus_ 2-3 inches in breadth, pale grey, blueish-grey, or greenish, smooth, convex at first, becoming gradually plane, umbonate, rarely depressed, mostly subregular, but sometimes repand, not very fleshy. _Lamella_ somewhat decurrent, whitish, straight, irregular, changing to pale flesh-colour. _Stipes_ 1-2 inches high, seldom straight, firm, 2½ lines thick, whitish or greenish, solid.

A beautiful species, with an odour like woodroof.

20. *Ag. dealbatus*, scentless; white, pileus unequal, thin, smooth; lamellae adnate, numerous; stipes solid, equal, glabrous.

_Var. y._ pileus repand, lobed, umbonate, stipes short, slender.


_Hab._ In pastures, waste places, &c. very common in autumn.

_Pileus_ smooth, slightly fleshy, plane, umbonate, sometimes depressed from the turning up of the margin, 1½ inches broad, white. _Lamella_ narrow, irregular, white. _Stipes_ short, crooked or straight, rather tough, smooth, white.—Subgregarious, polymorphous.

**Pileus dry. Lamella very distant, arched, decurrent.**


_Hab._ In open and dry pastures, as well as in meadows and more moist situations. King’s Park, very common. August to November.

_Pileus_ variable, often monstrous, firm, 1-2 inches broad, compact, margin thin, very dry, smooth, deep buff, convex, more or less umbonate, rarely becoming quite plane, but frequently remaining obtusely conical. _Lamella_ very distant, thick, arched, decurrent, reddish buff. _Stipes_ 1-2 inches high, ¼-½ an inch thick, firm, generally somewhat crooked, attenuated towards the base, same colour as the pileus, but rather paler, solid, spongy in the centre.

***Pileus moist, glutinous. Lamella various. Stipes hollow.*** (Mild, but not eaten).


A polymorphous plant, especially in regard to colour. Pileus acutely conical, smooth, slimy, particularly while young, fleshy, margin striate, irregular, frequently lobed, 1-2 inches from the base to the apex of the cone, becoming partly expanded in age; the margins sometimes turning up, and even revolute, mostly some shade of deep yellow, orange or bright red, often intermixed with each other, in some varieties brown or even nearly black, the brightest colour then remaining longest at the margin. Lamellae numerous, more or less deep yellow, ventricose, but attenuated towards the stipes, to which they are frequently slightly attached. Stipes hollow, with a great tendency to split, variously coloured like the pileus, 2-3 inches high, diameter various.

**** Pileus dry, minutely squamulose or scurfy. Lamellae usually arched and decurrent.


Pileus flesh colour, or pinkish brown, darker in wet weather, becoming pale, farinaceous from very minute scales, striate when moist; convex, or even campanulate, becoming depressed in the centre, sometimes nearly plane; margin irregular, often undulate, and in age frequently collapsed and roli-
led, 1-1½ inches broad. Lamellæ distant, thick, arched, somewhat decurrent, pink, sometimes branched, farinaceous, often with a sort of bloom. Stipes hollow, 3–5 inches high, crooked, unequal, 2–3 lines thick, flesh colour or pale brown.


Pileus convex, becoming depressed by age, 1-2 inches broad, rich purple, fading when dry, minutely squamulose, margin even or waved. Lamellæ very distant, thick, slightly decurrent, margin more entire than in the preceding, deep, clear violet-purple. Flesh purple, fibrous. Stipes 2-4 inches long, unequal, attenuated towards the base, subsolid, hollow when old, greyish purple, seldom straight.

***** Pileus thin, not glutinous. Lamellæ almost free;—somewhat fragile.


Hab. In fir-woods and in pastures. Swanston wood, and in fields about Edinburgh. Autumn.

Pileus campanulate, at length nearly plane, dry, smooth, thin, brittle, pellicund, 2–3 inches broad, dark grey brown, lighter at the margin. Lamellæ distant, thickish, white, almost free, broad towards the stipes, and truncate, "sometimes forked at the outer end," (With). Stipes hollow, 2-3 inches high, ½–¾ an inch in diameter, compressed, often splitting, twisted or irregular.—Whole plant brittle, and of a watery substance.

***** Pileus fleshy, viscous. Lamellæ scarcely fixed. Stipes radicating.


Hab. In woods, especially by the sides of the rotten stumps of felled trees. Autumn. Newliston wood, and at Foxhall. Woods at Balmuto, abundant.

Pileus 2–5 inches in breadth, yellowish or greenish brown, viscid, rugose, tough, elastic, broadly conical, at length plane, umbonate. Lamella white, distant, scarcely attached to the stipes. Stipes 4–8 inches high, gradually attenuated upwards, straight, yet twisted, firm and tough, greenish or whitish brown, with a very long fusiform root.

The pileus is so tough and elastic, that it may be folded between the fingers without injury. The root is often a foot long, and said by Fries to be perennial.

29. Ag. velutipes, pileus nearly plane, brown orange, glutinous; lamellæ ventricose, yellowish; stipes incurved, velvety

**Habit.** Woods, borders of fields, waste places, &c., on rotten stumps of hollow or felled trees. The whole year, but chiefly in the autumn. Very common.

*Pileus* 1-3 inches broad, convex, at length nearly plane, thin, smooth, soft, brownish orange, regular or repand, sometimes waved at the margin, when very young, involute. *Lamella* numerous, white, at length yellow, unequal, some slightly adnate, others free, truncate. *Stipes* incurved, unequal, hollow, 2-9 inches long, near ⅓ of an inch in diameter, pale above, below reddish-brown or blackish, and villose or velvety.

******** **Pileus** tender, not glutinous. *Lamella* free, numerous, white. *Stipes* thicker at the base.


*Plant* solitary or tufted, very variable in point of size. *Pileus* whitish, pinkish, yellowish, or livid, 1-3 inches broad, plane, sometimes depressed, somewhat fleshy, thin, tender, easily injured, of a watery substance. *Lamella* free, white, or very pale flesh-colour, soft, tender, entire or serrate, numerous. *Stipes* hollow, 2-3 inches long, about ⅜-⅞ of an inch thick, shining, splitting, sometimes twisted, same colour as the pileus, but the summit of the stipes is generally darker and pinkish.

The whole plant is fragile, and the pileus is easily detached from the stipes.

******** **Pileus** subcoriaceous, dry. *Lamella* free, distant, pale.


**Habit.** In oak woods among rotten leaves. Autumn. Foxhall, Captain Wanch. Newliston woods and Dundas Hill.

*Pileus* 1-2½ inches broad, convex or campanulate, at length nearly plane, somewhat umbonate, yellowish or pale reddish, and growing paler in age when the surface becomes subrugose or broadly striate, and very coriaceous. *Lamella* distant, but varying, narrow, pale, reddish buff, free, but touching the stipes. *Stipes* 2-3 inches long, scarcely two-eighths of an inch thick, cylindrical, smooth, solid, tough and firm, pale yellowish, opake, surrounded towards the base with a yellow woolly mass.

Whole plant very coriaceous and juiceless; dries remarkably well.

32. *Ag. oreades,* pileus tough, subumbonate, reddish, becoming buffish or very pale, opake; lamellae distant, whitish;

Hab. In meadows and pastures, frequent. May to November. Caro-line Park, and probably common elsewhere.

Pileus convex, or very obtusely conical, rarely becoming quite plane, generally umbonate, 1-2 inches broad, buffish, at length nearly opake white, coriaceous, tough, edge often turning up in age; "there is frequently a sudden depression of the border at some distance from the centre," (With.) Lamella distant, rather broad, free, buffish white. Stipes solid, whitish, cylindrical, firm, 2-3 inches high, becoming suddenly enlarged under the pileus, so as to be contiguous to the lamellae, and make them appear adnate at first sight.

This species frequently forms Fairy-rings. It is eaten in France, and thought nearly equal to the true Moucheron.

Sect. 7. (Collybia, Fries. Part of Mycena and Ompahlia, Pers.)

Stipes hollow, often, however, so slender, that a line is all that is visible, equal, firm, cylindrical, often radiating. Pileus carnoso-membranaceous, not brittle, convex, at length plane, often depressed in the centre, smooth, not glutinous. Lamella obtuse towards the stipes, either free or fixed, never decurrent, unequal, juiceless, entire. General colour white, rarely yellowish.—Small, dry, persistent fungi, often gregarious, sometimes on the ground, but commonly on dead leaves, sticks, &c. The pileus very rarely attains 1 inch in breadth.

* Pileus scarcely umbilicated. Lamellae distinct from the pileus. Stipes white or pale reddish.


Hab. In woods on the black remains of some of the larger Agarics of a former season, and among moss and dead leaves. Autumn. Woods. Balmuto.

Plant gregarious. Pileus ¼-¼ of an inch broad, plane, smooth, rarely subumbonated, white, or tinged with brown, thin, dry. Lamellae very numerous, white, adnate, narrow. Stipes ½-2 inches high, slender, substifulose, smooth, white, often curved towards the base, and springing from a chestnut-coloured tuber.


Plants minute, subgregarious. Pileus about 2 lines broad, slightly umbilicate, delicate, convex, thin. Lamellae broad, adnate, white, not numerous. Stipes filiform, about an inch long, whitish: a longitudinal section shows a mere line down the centre. Root sometimes long.

Hat. On small dead sticks and twigs, in woods, hedges, &c.: frequent during the whole year.

**Pileus** opake, white, smooth, plane, in age somewhat wrinkled and depressed in the centre, 3-4 lines broad. *Lamella* subdistant, narrow, white. *Stipes* short, ¼-⅓ of an inch high, half a line thick, rather firm, whitish or reddish white, minutely squamulose.


Hat. In woods, on sticks, dead leaves, &c. the whole year. Foxhall, Captain Wauch. In moist woods about Edinburgh.

Plant gregarious, often with an elongated, branching stipes. *Pileus* thin, more or less convex, one-eighth to three-eighths of an inch broad, white, plicate, dimpled in the centre, margin somewhat crenate. *Lamella* white, distant, attached to a collar similar in substance to themselves, which surrounds, but does not touch the stipes. *Stipes* filiform, frequently branched and sarmentose, hollow, white above, and black below, corneous.


Hat. In woods among dead leaves, on sticks, &c. The whole year, very common.

Plant gregarious. *Pileus* convex or plane, scarcely depressed in age, 2-3 lines broad, thin, white. *Lamella* white, subdistant, adnate. *Stipes* filiform, 1-2 inches long, hollow, tough, twisted when dry, white at the top, black below.

This species often produces very slender barren stems, which are much branched and entangled, some of the branches being as fine as a human hair. Fries has rightly conjectured it in this state to be *Rhizomorpha setiformis* of Persoon.


Hat. In woods on dead leaves, especially those of the ivy. Autumn. Foxhall, Captain Wauch.

Plant gregarious. *Pileus* white, nearly plane, at length umbilicate, 2-5
lines broad, rugoso-plicate. *Lamella* very few, remote, white, adnate. *Stipes* ½–1 inch long, very slender, hollow, white at the top, dark below, almost smooth to the naked eye.


**Hab.** On dead branches of trees in woods. Autumn. Foxhall, Captain Wauch.

*Plant gregarious. Pileus convex, rarely quite plane, plicate, reddish-brown, ½–⅓ of an inch broad, thin, glabrous. *Lamella* adnate, narrow, yellowish, distant. *Stipes* about an inch long, thin, dark brown, minutely velvety or hairy.—Smell disagreeable.*

**Sect. 8. (Mycena, Pers.)**

*Pileus more or less brown. Stipes smooth.*


**Hab.** In woods among dead leaves, in autumn. Rare. Foxhall, Captain Wauch.

*Pileus campanulate, at length nearly plane, remotely striate, ½–1 inch broad, yellowish-brown, dry, thin, but not tender. *Lamella* subdistant, whitish, free or nearly so. *Stipes* 3–4 inches long, 2 lines thick, hollow, shining, dark rich brown or blackish, pale at the top, velvety towards the base, sometimes only at the base, dry.—Plant generally smelling of garlic, but not constant in this respect.

Much confusion exists between *Ag. Alliaceus* and *porreus* of authors, which *Fries*, in his late work, has rather increased than removed; as is evident under *Ag. porreus*, where he quotes Bulliard and Sowerby, whose figures are very different. In the former the stem is solid, very hairy, and much attenuated upwards; the lamellae are numerous, and the whole habit different from the figures of the latter, the stems of which are hollow, comparatively smooth, nearly equal, and the lamellae distant.


**Hab.** By the sides of rotten stumps of trees, and among grass and moss; extremely common. Autumn.
**Pileus more or less membranaceous, campanulate or conical, subrugose, more or less striate.** **Stipes** various, sometimes very long, rigid, scarcely shining, glabrous, except at the base which is strigose or woolly, hollow, pale, but of various shades of colour, most frequently blueish-grey or purplish.—In a variety which grows solitary, the stem is filiform, long, and less firm.

**Stipes rigid, strongly striate. Pileus dark blueish-grey.**


**Hab.** In woods among dead leaves, and at the roots of trees, particularly hazel. Autumn. Among the hazel trees in the garden at Foxhall. *Plant* gregarious, frequently tufted. *Pileus* conical, becoming campanulate, the margin at length turning up, in which state the centre appears umbo-nate, ½-1 inch broad, striate, tenacious, cinerous or blueish-grey. *Lamella* almost free, whitish, narrow. *Stipes* 3-5 inches long, or more, hollow, firm, rigid, strongly striate, blueish, with a silvery lustre, rarely brownish.

**Pileus bright reddish, or rose-purple. Stipes smooth.**


**Hab.** In woods, on dead leaves and twigs, or on the cones of the Scotch fir. Autumn. Balmuto. *Plant* subgregarious, subfasciculate. *Pileus* 3-5 lines broad, campanulate, with a rather short fleshy umbo, smooth, bright red or red orange, striate at the margin. *Lamella* adnate, with a decurrent process, distant, whitish-red, edges dull and darker red. *Stipes* hollow, 1-2 inches long, firm, smooth, pale red, strigose at the base and whitish, often with a long root. An elegant and rare species, as would appear from the few writers who have noticed it.


**Hab.** In shaded woods, frequent. Balmuto. Abercorn Park, Duddingston. Autumn. *Plant* subgregarious, or subfasciculate. *Pileus* ½-2 inches broad, convex, obtuse, smooth, very delicate, dilute rose-colour. *Lamella* broad, ventricose, adnate, rather numerous, pale rose. *Stipes* unequal, hollow, 2-4 inches long, glabrous, somewhat incurved at the base, which is strigose, colour pale rose.—The colour of the whole plant varies from purplish,
rose, and lilac to brownish, very pale, and, according to Fries, even to a yellowish hue.

Sect. 9. (Omphalia, Pers.)

Stipes solid, generally becoming hollow in age, not bulbous. Pileus membranaceous, or slightly fleshy, sometimes even carnoso-coriaceous, while young umbilicated, afterwards either plane or wholly funnel-shaped, margin reflexed or patent. Lamellae adnate or decurrent, unequal, juiceless. Sporidia white. Colour various.

* Small. Pileus submembranaceous. Lamellae decurrent.


Hab. On the ground, in woods among moss, and in pastures. Autumn. Slateford, Craiglockhart, Braid Hermitage, &c.

Pileus 2-5 lines broad, depressed in the centre, margin turned down, pale in age, striate when moist, reddish orange. Lamellae broad, distinct, very decurrent, orange. Stipes solid in the young plant, at length hollow, ¼-1 inch long, very slender, pale orange.


Plant gregarious. Pileus convex, umbilicated, ¼-1 inch broad, reddish-brown, striate, margin often turned up in age. Lamellae broad, pale whitish-brown, distant, decurrent. Stipes short, ¼-½ of an inch high, thickish, usually subincurved, pale brown, solid.


Plant subgregarious. Pileus ¼-1 inch broad, depressed in the centre, margin deflexed, and sometimes waved, striate, whitish, whitish-brown or yellow, darker when moist. Lamellae broad towards the stipes, whitish, decurrent. Stipes ¼-1 inch long, about 1 line thick, whitish or yellowish, paler below and pubescent.

Liable to some variation in regard to colour, and the length and firmness of the stipes.

** Plants somewhat larger. Lamellae not decurrent.


Hab. In meadows and pastures. Autumn. I have mislaid my note of this species, but as far as I can recollect, it was gathered at Carlowrie.
Agaricus. Cryptogamia. Fungi. 385

Pileus 1-2 inches broad, plane, sometimes slightly depressed in the centre, subfalcate, smooth, striate at the margin when moist, colour pale, livid-yellowish or brownish; "stone-colour" (With). Lamellae, rather numerous, white. Stipes 2-3 inches high, 2-3 lines thick, solid, fibrous, white, somewhat attenuated upwards.


Hab. On the ground, in woods, in waste places, and among grass, &c. Autumn and mild winters. Foxhall, Captain Wauch.

Pileus brown or fuliginose, 1-2½ inches broad, smooth, becoming paler when dry, funnel-shaped. Lamellae adnate, but on account of the form of the pileus seemingly decurrent, brownish, always paler than the pileus, not very numerous, sometimes forked. Stipes 2-4 inches long, solid, at length hollow, subfibrillose, villous at the base, brown.

Series II. Veil none. Lamellae changing colour. Sporules rose-coloured. (Hyporhodius, Fries.)

Sect. 1. (Clitopilus, Fries.—Part of Gymnopus, Pers.)

Stipes tolerably firm, subequal, separating from the pileus. Pileus fleshy, campanulate or convex, at length nearly plane, not glutinous, regular, rarely umbilicate. Lamellae unequal, changing colour, never much decurrent. Colour various.—Fungi of a moderate size, nearly scentless, mild. Not edible.

50. Ag. phlebophorus, pileus convex, at length plane, clear olive or yellowish-brown, smooth, but minutely rugose, as if veined towards the centre; stipes hollow, rather twisted; lamellae ventricose. Ditm. in Sturm's Fung. t. 15. Fries, Syst. Mycol. v. 1. p. 200.


Pileus 1-2½ inches broad, slightly convex or plane at maturity, submembranaceous, and thin for the size of the plant, but rather firm, pleasant yellowish-brown, apparently marked with branching veins from the centre, which are in reality prominent rugose folds of the epidermis. Lamellae rather numerous, broad, ventricose, free, white, changing to rose-colour from the sporules. Stipes 2-4 inches long, 3-4 lines thick, whitish, somewhat twisted, mostly hollow, frequently incurved at the base, which is slightly thickened.

Sect. 2. (Leptonia, Fries.—Part of Gymnopus, Pers.)

Stipes separating from the pileus, when young filled with a fibrous mass, afterwards subhollow, equal. Pileus campanulate or convexo-plane, never viscous or striate, surface fibrillose. Flesh very thin. Lamellae subobtuse next the stipes, fixed or free, never decurrent, rather broad, at length rose-coloured. Colour carmine or grey.—Small, durable, scentless, insipid fungi. Not used as food.

HAB. Pastures, very common. July to September.

Pileus campanulate, obtuse, slightly scaly, \( \frac{1}{2} - 1 \) inch broad, becoming darker in age. Lamellæ blueish, adnate, serrulate. Stipes 1-2 inches long, 1 line thick, rather fragile, solid, blue.—A beautiful species.

**Series III.** Furnished with a cobweb-like veil. Lamellæ changing colour. Sporules ochraceous. (Cortinaria, Pers.)

**Sect. 1.** (Inoloma, Fries.—Part of Cortinaria, Pers.)

Veil in the form of free cobweb-like marginal filaments, fugacious. Stipes solid, bulbous, fibrillose, fleshy. Pileus fleshy, convex while young, at length expanded, fibrillose or viscid, regular. Substance succulent. Lamellæ adnate, broad, changing colour. Sporules copious. Colour of the pileus and the lamella more or less violet.—Rather large fungi, firm, sub succulent, growing on the ground. None but Ag. violaceus have been tried as food.


Pileus 3-5 inches broad, convex, sometimes a little depressed in the centre in very old plants, margin rounded, faint violet or violet-brown, colour brightest at the margin, smooth, or sometimes fibrillose, or somewhat squamose, fleshy. Lamellæ adnate, more or less violet, numerous, irregular in length. Stipes tomentose in young plants, 3-4 inches long, \( 1\frac{1}{2} \) of an inch in diameter, bulbous, solid, spongy, flesh tinged with violet.


HAB. In woods, Balmaino. Newliston woods, &c., not unfrequent. Autumn.

Pileus 2-4 inches broad, convex, margin much rounded, glutinous when young, afterwards seeming varnished, colour rather various, chiefly pale reddish-brown, with a violet tinge towards the margin, which is mostly villose. Lamellæ adnate, cinnamon colour, numerous, serrulate. Stipes 2-3 inches long, solid, often 1 inch in diameter, whitish, tinged with purple, woolly when young, bulbous at the base. Flesh white, tinged with pink or violet.—Whole plant compact, insipid; frequently gregarious.

**Sect. 2.** (Dermocybe, Fries.—Part of Cortinaria. and Gymnopus, Pers.)

Veil dry, cobweb-like, very fugacious. Stipes subequal, scarcely even bulbous, fibrillose, firm, solid, at length often hollow. Pileus more or less fleshy, margin thin, convex, or slightly conical, often unbonate, fibrillose. Lamellæ unequal, broadish, numerous. Colour various.—Medium or small fungi remaining a long time; not eaten.

54. Ag. cinnamomatus, pileus glabrous, subcarnose, obtusely umbonate, cinnamon colour; lamellæ numerous, adnate, yellow-cinnamon; stipes yellowish, rarely straight. Sow. Fung.


**Pileus** plano-convex, bluntly umbonate, 1–3 inches broad, farinaceous, cinna-mon-buff colour, the farinaceous matter whitish, margin thin, uneven. Lamella numerous, broad, adnate, but easily detached, and in old plants nearly free, cinnamon. Flesh white. Stipes 2–3 inches high, solid, 2–4 lines thick, whitish, or tinged with brown. The remains of the veil are often left for a long time on the stipes, in some instances producing the effect of a collar.

**Series IV. Veil not cobweb-like. Lamella changing colour: Sporules ferruginous. (Derminius, Fries.)**

**A. Veil distinct.**

**Sect. 1. (Pholidita, Fries.—Part of Lepiota and Gymnopus, Pers.)**

Veil dry, annular, either membranaceous or floccose and radiate. Stipes cylindrical; subsquammose, rarely bulbous. Pileus convex, at length nearly plane, not umbilicated. Lamella unequal, juiceless, changing colour. Sporules ferruginous.


Plant tufted, tufts sometimes very large. Pileus 2–5 inches broad, more or less convex, obtusely umbonate, covered with revolute brown scales. Lamella numerous, irregular, rather narrow, pale yellowish, or greenish. Stipes 3–7 inches long, solid, squarrose with scales; equal or attenuated at the base, colour same as the pileus. Veil attached to the stipes in the form of a collar, sometimes ragged, and partly adhering to the margin of the pileus.

57. *Ag. mutabilis*, pileus scarcely fleshy, glabrous, striate; when moist, dull cinnamon colour, becoming pale; lamellae subdecurrent, numerous, reddish-brown; stipes hollow, subin-


Pileus nearly plane, subumbonate, smooth, rarely squamulose, nut-brown and striate when moist, becoming pale in drying. Lamella numerous, dull reddish-brown, rather broad, slightly decurrent. Stipes 1 ½-3 inches long, about 2 lines thick, hollow, sub incurved, rarely straight, whitish-brown. Veil distinctly annular, but fugacious.

B. Veil very fugacious or simply marginal.

Sect. 2. (Inocybe, Fries.—Part of Cortinaria and Gymnopus, Pers.)

Veil formed of a continuation of the fibres of the pileus, very fugacious. Stipes solid, rarely hollow, firm, scaly or fibrillose. Pileus more or less fleshy, campanulate, convex, at length expanded, subumbonate, dry, firm, scaly or silky, with innate longitudinal fibres. Flesh white. Lamella free, or nearly so, appearing adnate aferwards, from the change of form in the pileus, numerous, ventricose, whitish, often denticulate and discoloured at the margin. Colour whitish, subfuscous, &c.

—Medium or small fungi, solitary, growing on the ground, persistent. Probably poisonous.


Hab. On the ground, in woods, borders of moist fields, &c. Autumn. Foxhall, Messrs Wauch and Greville.

Pileus ½-1 inch broad, campanulate, subumbonate, dingy greyish-brown, scaly. Lamella pale dingy brown, rather numerous, nearly free. Stipes 1-1½ inches long, 2-3 lines thick, solid, whitish, fibrillose, furnished with a sort of bark-like external coat.—Sometimes subgregarious.


Pileus 1-2½ inches broad, campanulate, becoming plano-convex, umbonate, pale satiny brown, sometimes darker, surface splitting into numerous longitudinal small clefts. Lamellæ numerous, subadnate, pale brown, slightly ventricose. Stipes solid, 2-4 inches long, 2 lines thick, firm, whitish, somewhat tuberous at the base, rarely quite straight.

Sowerby’s plate represents the variety with a dark coloured pileus; the colour, however, depends a good deal on the weather, being much paler in warm sunny days.


389

Hab. On the ground, in woods and shaded places. July to October. Granton woods.

Plant gregarious. Pileus conical, becoming campanulate, at length spreading, sharply umbonate, \( \frac{1}{4} \)–1 inch broad, whitish, brown, or even violet, often cracking at the margin and on the surface of the pileus. Lamellae reddish-brown, often tinged with violet, rather broad, not numerous. Stipes 1–3 inches long, firm, solid, fibrillos, 1–2 lines thick, crooked, equal.

Sect. 3. (Galeria, Fries.—Part of Mycena, Pers.)

Veil floccoso, very fugacious, but certainly present. Stipes hollow, slender, separating from the pileus, rarely naked, but mostly covered with a sort of bloom or fibrilla. Pileus membranaceous, conical, afterwards campanulate, rarely more expanded, substrata when moist, becoming paler when dry, wholly without scales or superficial fibres. Lamellae either touching the stipes or adnate. Colour mostly reddish-buff.—Slender, fragile fungi, mostly on moist ground. No smell, and useless.


Hab. Pastures, grass-plots, &c., extremely common. May to November.

Pileus very obtusely conical, smooth, deep rich buff, about half an inch from the base to the apex of the cone. Lamellae not numerous, adnate, rich reddish-brown, about 1 line broad, sometimes reaching below the margin of the pileus. Stipes hollow, 3–4 inches long, scarcely more than 1 line thick, striate towards the top, brown, fragile.—The whole plant is of a deeper colour in moist weather, when it acquires a subpellucid appearance.


Hab. On the ground, among moss. Autumn. Foxhall, Captain Wauch.

Pileus reddish, brownish, buffish-red, &c., very small, not \( \frac{1}{4} \)th of an inch in diameter, conical, at length campanulate, striato-sulcate when moist, membranaceous. Lamellae few, adnate, reddish-brown, rather broad. Stipes about an inch high, filiform, hollow, rather paler than the pileus, slightly crooked.

This plant is liable to much variation, and Fries has no fewer than five varieties. It is very common, and in a short time the varieties will probably be discovered in this vicinity. \( \gamma \) and \( \iota \), grow in bogs.

Sect. 4. (Tapinia, Fries.—Part of Omphalia, Pers.)

Veil marginal, villose, fugacious. Stipes equal, expanding into the pileus. Pileus more or less fleshy, smooth, naked, plano-convex when young, with a villose involute margin, afterwards depressed, and broadly umbilicate. Lamellae adnato-decurrent, numerous.—Persistent fungi, mostly on the ground; not edible.

63. Ag. involutus, compact; pileus depressed, ochrey-brown, with a tomentose involute margin; lamellae mostly dichotomous;


Pileus 2–3 inches broad, depressed in the centre, margin much rounded, involute and villose, yellowish or ochrey-brown, very smooth when dry. Lamelle rather numerous, sometimes simple, but mostly irregularly forked, brown-yellow, somewhat decurrent. Stipes 2–3 inches long, solid, firm, sometimes hollow in old plants, ½–1 inch thick, brownish-buff; frequently stained or spotted, often not central, and incurved at the base.

Series V. Furnished with a veil, not cobweb-like. Lamelle changing colour, mottled, more or less dissoluble. Sporules brownish-purple. (Pratella, Pers.)

Sect. 1. (Psalliota, Fries.—Part of Pratella and Lepiota, Pers.)

Veil in the form of a collar, subpersistent, partial. Stipes firm, subequal, separating from the pileus. Pileus more or less fleshy, convex or broadly campanulate, either viscous or furnished with scales or fibrillae. Lamelle free or fixed, broad, becoming dark.—Some are edible. Traces of a nearly general veil are seen in Ag. campestris, Georgii and aeruginosus.


Hab. Pastures and meadows, less frequently in woods. Extremely common. April—September.

Plant frequently gregarious. Pileus fleshy, convex, at length plane, 2–5 inches broad, white, changing to yellowish or brownish, subsquamoso or nearly smooth. Flesh white. Lamelle numerous, free, rose-pink, changing to deep purplish-brown, broad. Stipes 2–3 inches long, ½–¾ of an inch thick, white, firm, solid, bulbous at the base, furnished with an annular veil.

This is the well known Mushroom of the English market, and frequently cultivated by artificial means.


Hab. In meadows, woods, and near buildings, &c. Autumn. Frequent.

Plant gregarious. Pileus convex, at length nearly plane, 4–12 inches broad or more, somewhat scaly, white or yellowish, at length discoloured, rather tough. Flesh thick, white, turning yellowish on being cut, and in some specimens exuding a yellow juice. Lamelle numerous, white, or very pale flesh colour, changing at length to deep purplish-brown, broad, free. Stipes 2–5 inches long, ½–1 inch thick, solid, whitish or yellowish, nearly smooth, and furnished with a strong persistent collar.

Ag. Georgii derives its name, according to Parkinson, from springing up about the time of St George's day. It is unquestionably the largest of the British agarics. It has been known to weigh 14 lb. Mr Hopkirk mentions
one that weighed 5 lb. 6 ounces, and measured 43 inches in circumference; but Mr Stackhouse found it to attain the enormous size of 18 inches in diameter, which is 54 in circumference, having a stem as thick as a man's wrist. The best distinguishing marks are,—the extreme paleness of the lamellae at the period of the bursting of the veil, compared with the true mushroom; the greater convexity and thickness of flesh at the same period, and shortly afterwards the more yellowish and tough pileus.


*Hab.* Pastures, meadows, and grassy woods. Extremely common. May to November.

*Pileus* 4½-1½ inches diameter, hemispherical, rarely in large specimens becoming plano-convex, yellow, or reddish-orange, very slimy, smooth. *Lamellae* rather numerous, broad, horizontal, (extending in a straight line or nearly so from the margin of the pileus to the stipes), broad, much mottled with the purplish-black sporules. *Stipes* 3-6 inches long, pale yellowish, firm, more or less crooked, hollow, glutinous, furnished with a more or less perfect annual veil.


*Hab.* On the ground in woods, meadows, or on rotten stumps, &c. Autumn, very common. Foxhall, Captain Wauch. Abundant elsewhere.

*Pileus* 1-4 inches broad, convex, at length nearly plane, umbonate, verdigris-green, very slimy, the slime blue, which, when removed, leaves the pileus of a yellowish or reddish-yellow colour. *Flesh* white, tinged with blue. *Lamellae* rather numerous, purplish-brown, adnate, broad. *Stipes* 2-3 inches long, 2-6 lines thick, whitish, verdigris-green, hollow, furnished with a subsistent white collar. In old plants the glutinous matter which covers the pileus is often partially washed off by the rain, or removed by other causes.

**Sect. 2. (Hypholoma, Fries.—Part of Coprinus and Patella, Pers.)**

Veil, a web-like curtain, fugacious, fixed to the stipes, and to the margin of the pileus. Stipes somewhat hollow, firm, separating from the pileus. *Pileus* fleshy, convex, at length nearly plane. *Lamellae* adnate, numerous, becoming more or less moist. —Tufted fungi, growing mostly from rotten stumps.


*Hab.* In woods, borders of fields, road-sides, &c. chiefly on or near old stumps of felled trees. Autumn. Caroline Park.

Tufted. *Pileus* convex, at length nearly plane, often irregular, fleshy, 2-4 inches broad, pale yellowish-brown, surface very woolly or fibrous. *La
CHYPTOGAMIA. FUNGI. AGARICUS.

*mella* numerous, adnate, pale, becoming reddish, at length brownish-purple, broad, exuding a thin, grey, transparent fluid at their margins. *Stipes* 2-4 inches long, 2-4 lines thick, whitish or whitish-brown, hollow, fibrillose, somewhat incrassated at the base. *Veil* leaving traces and portions on the stipes and margin of the pileus.


**Hab.** On rotten stumps of trees, or near trees. May to November. Very common about Edinburgh.


When growing out of a hollow tree, &c. the stipes is very long.—The surface of the pileus of some of the plants is often completely discoloured by the falling of the sporules of those immediately above them.


**Hab.** On rotten stumps of trees, or among grass, but attached to roots of trees. May to October. Auchindenny woods, and probably in many other places.


**Sect. 3. (Coprinarius, Fries.—Part of Coprinus and Praetella, Pers.)**


**Hab.** On dung in pastures, from spring to autumn; very common.

*Pileus* campanulate, but very obtuse at the summit, ¾-1½ inches from the base to the apex, not expanding at the base without cracking, yellowish-white, glutinous, smooth, polished, "wrinkled when old like washr-leather," (With.) *Lamellae* 2-3 lines broad, vanishing towards the margin of the pileus, very dark grey, numerous. *Stipes* 3-6 inches high, white.
Agaricus. CRYPTOGRAMA. FUNGI. 393

hollow, rather firm, 2–3 lines thick, shining, somewhat bulbous, sprinkled with the dark sporules. Veil rather fugacious.


Pileus conical, at length plane, ¼–⅓ of an inch broad, membranaceous, plicate, pale yellow, deepest in the centre, and smooth. Lamellae distant, pale, at length brown-red or flesh colour, narrow, mottled. Stipes scarcely more than 1 line thick, 3–4 inches long, hollow, weak, yellow.—A very elegant species, possessing, according to Withering, a strong and disagreeable smell.


Hab. On decaying trunks, and rotten stumps of felled trees, extremely common. Spring to autumn.

Crowded. Pileus ovate, conical, at length campanulate, ¼–⅓ an inch from the base to the apex, striated and plicate, membranaceous, pale buff or reddish-brown, at length grey, becoming flaccid and dissolving. Lamellae distant, narrow, pale brown. Stipes 1–3 inches long, slender, weak, brittle, crooked, hollow, pale yellowish, whitish or greyish.—Particularly partial to old willow trees, and when growing on a stump of a felled tree often covering nearly a square yard.

Series VI. Lamellae free, dissolving along with the pileus. Veil general. Sporules black. (Coprinus, Pers.)

Stipes hollow, straight, fragile, subsquamos, white. Pileus membranaceous rarely somewhat fleshy, ovato-conical when young, becoming campanulate, at length tearing and revolute, dissolving; more or less covered with separating flocculi (the remains of the veil), and separating from the stipes. Lamellae white, at length blackish.—Fugacious fungi, mostly on dunghills, rich grassy places, and rotten trunks of trees, delighting in rainy or moist weather. Taste nauseous. Not edible.


Hab. In rich grass, waste ground near stables, and in kitchen-gardens. Very common. Autumn.

Subgregarious. Pileus cylindrical when young, at length conico-campanulate, 3–6 inches from the base to the apex, white, with the surface formed into large woolly scales, at length changing to a pinkish hue, and at last splitting, turning up, and dissolving into a black fluid. Lamellae crowded, contiguous, broad, white, changing to a pink-brown and black free. Stipes white, hollow, fibrous within, cylindrical, bulbous.

_Hab._ In villages, and in the neighbourhood of dunghills, also at the roots of trees, extremely common. Autumn.

_Tufted._ *Pileus* brown-white or silvery grey, darker at the summit, remaining campanulate for a considerable time, above 2 inches from the base to the apex, obtusely and irregularly plicate, unequal, at length becoming plane and revolute. *Lamella* free, silvery, grey, changing to black, contiguously to each other, ventricose, dissolving in age. *Stipes* hollow, white, 3-8 inches long, cylindrical, about ¼d of an inch thick.

This species is well marked by the large folds or plaits which often extend from the base to the very apex of the pileus.


_Hab._ At the roots of trees, gate-posts, &c. extremely common. May to November.

_Tufted._ *Pileus* ovato-campanulate, 1-1½ inches from the base to the apex, striated and furrowed, brownish-orange or yellow, sometimes ferruginous, surface sprinkled with shining particles, in age turning up, becoming plane, and dissolving into a blackish fluid. *Lamella* numerous, free, whitish, passing from brown-grey and reddish to black. *Stipes* 3-5 inches long, 3-5 lines thick, white, fragile, cylindrical, somewhat attenuated upwards.


_Hab._ In gardens, rich meadows, and on dung. Very common. July to October.

*Pileus* conico-campanulate, 1-2 inches broad, dark grey, furfuraceous or minutely scaly, smooth at the apex, plicate, membranaceous, very fugacious, soon becoming plane and revolute, and dissolving. *Lamella* 1 line broad, dark grey, free, very tender. *Stipes* 5-9 inches high, hollow, white, about 3 lines thick, brittle, delicate, attenuated upwards, and "swelling below like the stem of an onion," (Bolte) sometimes scaly.

Extremely rapid in its growth, attaining perfection and dissolving in the course of a few hours. At its first appearance, it is covered with the delicate frosted remains of the veil.


_Hab._ On dung, frequent. Autumn.

*Pileus* campanulate, straight, at length expanded and revolute, ¼-1 inch broad, white while young, and covered with delicate white farinose scales,
membranaceous, turning reddish and at last black. Lamella very narrow, free, but touching the stipes, distant, white, soon becoming reddish and black. Stipes 2-4 inches long, about 2 lines thick, white, fragile, somewhat attenuated upwards, hollow but fibrous.


Hab. On dung, and in kitchen-gardens, extremely common. Spring to autumn.

Plant extremely fugacious. Pileus cylindrical, furfuraceous, at length plane, nearly naked, umbilicated, grey, yellowish-brown in the centre, beautifully plicate, membranaceous, subpellucid. Lamellae free, dark grey, subdistant, very narrow, tender. Stipes 1-3 inches long, very slender, fragile, smooth, grey tinged with brown, sometimes white, hollow. A beautiful object, and so regular as to appear almost artificial.


Hab. On dunghills. May to autumn; very common. Very fugitive. Pileus campanulate, gradually becoming expanded and plane, splitting and revolute, while young squamose, white, often tinged with brown, at length dark grey-black and deliquescing, 4-1½ inches broad. Lamella white at first, then purplish, afterwards black and more distant, somewhat ventricose. Stipes 2-5 inches long, 1-2 lines thick, white, glabrous, brittle, slightly attenuated upwards, hollow.


Hab. On dung, not uncommon. May to November.

Pileus 1-2 lines broad, exceedingly delicate, ovate when young, and yellowish-brown, at length plane, and grey, the lamelle forming angles at the margin, producing the effect of the “spokes of a wheel,” centre ochraceous, striate, splitting. Lamella few, narrow. Stipes filiform, 1-1½ inches long, very weak, destroyed by a breath.

Series VII. Stipes decidedly excentrical, or lateral, or none.

(PLEUROTUS, Fries.)


Pileus obtuse, 3-5 inches broad, smooth, subcoriaceous, but within very
white, soft, yet of close texture, thick, sometimes marbled with livid spots. Lamellae numerous, broad, white, adnate or somewhat decurrent, irregular. Stipes excentrical, ascending, 2-3 inches long, about 1 inch thick, solid, firm, incrassated at the base, white, sometimes furfuraceous.

—Single or in tufts, varying a good deal in its texture.


HAB. Trunks of trees. Spring to autumn. Dundas Hill, rare.

Tufted. Pileus at first dark grey, then brownish, at length becoming pale, sometimes yellowish, 2-7 inches broad, smooth, plano-convex, margin rounded and involute, coriaceous. Lamellae numerous, whitish, decurrent, broad, anastomosing at the base. Stipes when present, almost lateral, solid, very short, frequently wanting, especially in large plants.


Gregarious. Pileus soft, becoming less so in age, 1-2 inches broad, plano-convex, pale yellowish or brownish, slightly fleshy, smooth. Lamellae rather distant, or not numerous, pale reddish-brown, somewhat ventricose towards the base, much attenuated towards the margin. Stipes none.


HAB. On sticks in damp woods and hedges. Spring to autumn, very common.

Often gregarious. Pileus ½-1 inch broad when reflexed, at first subresupinate, and involute, surface fine white, cottony. Lamellae numerous, at first white, at length reddish or pinkish-buff:

Div. II. Plants mostly furnished with a stipitate or sessile pileus, but sometimes resupinate or effused. Hymenium either in the form of obtuse subparallel veins, or irregular sinuous or pore-like folds. (Cantharellideæ).

140. CANTHARELLUS. Adans.

* Furnished with a stipes.

**CANTHARELLUS. CRYPTOGRAMIA. FUNGI.**

**HAB.** In woods, particularly of fir trees, borders of fields, &c. common. 
F. Foxhall, Captain Wauch. Balmuto. Summer and autumn.

**Pileus** 2–4 inches broad, often irregular and somewhat lobed, repand, depressed, margin rounded and often involute, yolk-of-egg yellow, but varying in shade, scentless when recent, but in a few hours smelling like ripe apricots. **Veins of the hymenium** subdistant, thick, dichotomous, sometimes anastomosing. **Stipes** 1–2 inches long, firm, attenuated at the base, solid, 2–3 lines thick, same colour as the pileus, smooth.


**HAB.** Moist woods, rare. Balmuto. Summer and autumn.

**Pileus** 1–3 inches broad, depressed, at length infundibuliform, yellowish liquid-brown. **Veins of the hymenium** decurrent, anastomosing, flexuose, yellow or flesh colour. **Stipes** 2–3 inches long, hollow, yellow, 2–3 lines thick, unequal.—Plants single or gregarious; scarcely edible.

**** **Sessile**—(on mosses in damp places).


**HAB.** On mosses, &c. in bogs and damp places. Duddingston Loch, among the reeds.

**Pileus** ½–1 inch broad, plane, membranaceous, dilute pale brown, lobed, attached at the edge, or nearly so, to mosses, by means of a few fibres. **Veins of the hymenium** branching. Not to be confounded with **C. muscigenus** or **retrius.** The latter has frequently been associated with it.

141. **MERULIUS. Hall.**


**HAB.** Rotten wood in vaults and cellars. Rotten wood in the open air in long continued wet weather. Very common. The whole year.

Whole plant generally resupinate, soft, tender, at first very light, cottony and white. When the veins appear they are of a fine yellow, orange, or reddish-brown, forming irregular plicae, most frequently so arranged as to have the appearance of pores, but never any thing like tubes. Sometimes the pileus or substance of the plant, from its situation, produces pendant processes like inverted cones. “The whole fructification often forms a circle of 1–3 inches in diameter.” Except in favourable situations, it does not produce fructification, and resembles a dry pithy cottony substance, whence it has been called the dry rot. When in a perfect state, the sinusus contain drops of clear water, which have given rise to the specific name. It is often very injurious to timber and wood-work.
**DIV. III. Plants with a stipitate or sessile pileus.** *Hymenium sinuosus; either irregular sinuosities of the same substance and texture as the pileus, or anastomosing lamellae, sometimes forming elongated and very flexuose pores.*

142. *DÆDALEA.* Pers.

* Furnished with a stipes—(rarely sessile).


Hab. On the ground, and on rotten wood. Autumn. Newliston woods, Messrs Wauch and Greville.

*Pileus* convex when young, at length plane or even depressed, velvety or hispid, 1–3 inches broad, irregular, furnished underneath with large, irregular, very flexuose or labyrinth-like pores, greyish or flesh coloured. *Stipes* when present very irregular, unequal, even grotesque, 1–2 inches high, of various thickness, ferruginous, sometimes wanting, when the pileus becomes dimidiate, as growing from the side of a rotten post. In this situation it is even sometimes imbricated.—When dry, it is hard and woody.

**Sessile and dimidiate.**


Hab. On the trunks of Oak trees, but particularly on old posts and paling, &c. The whole year.

Perennial. Size and form very various. *Substance* mostly corky and even woody in old plants, thick and tough. *Lamellae* thick, irregular, flexuose, branching and anastomosing, often forming large shapeless pores.—Sowerby's plate is excellent. Used as a styptic in stopping hemorrrhages.

**DIV. IV. Plants with a fleshy or corky pileus, stipitate, sessile, resupinate or effused. Hymenium porous or tubular.**

143. *POLYPORUS.* Michel.

* Furnished with a stipes.—(Very short in *P. squamosus*):

1. *P. perennis,* pileus coriaceous, velvety, zoned; pores minute, at length lacerating; whole plant cinnamon colour; stipes...
FUNGI.

stipes


Gregarious. Pileus coriaceous, thin, 1-3 inches broad, soft and velvety, marked with 2 or 3 concentric circles of colour, depressed in the centre, sometimes completely infundibuliform, occasionally fimbriated at the margin, and even waved. Pores small, roundish, or slightly angular, very shallow towards the margin of the pileus, or even disappearing, decurrent. Stipes 1-1 inch long, coriaceous or woody, very tough, unequal, often velvety, somewhat bulbous at the base.—The pilei, and even stems of several plants, are frequently found growing into each other, and forming one mass; whence Schumacher’s name of confluens.


Hab. On the trunks of trees, and on fallen branches and even small sticks, in woods. Frequent, the whole year. Foxhall and Newliston woods, Captain Wauch. Balmuto; Dundas Hill; Auchindenny woods; Abercorn Park, &c.

Extremely variable, and sometimes altogether wanting a stipes. Substance white, somewhat carnose when very young, at length very hard. Surface of the pileus smooth, not varnished, whitish, yellowish, or reddish-brown. Pores unequal, short, toothed under a magnifier, within pale dilute cinnamon colour, but the squamules white.—Sometimes solitary, at others gregarious, and even tufted. When furnished with a stipes, varying from half an inch to four inches in diameter. When tufted or imbri-cated, the whole mass is sometimes 4 or 5 inches broad.


Hab. Trunks of trees, and on the stumps of felled trees, particularly the Ash. Extremely common. June to October.

Solitary or gregarious. Pileus often very large, 6-12 inches broad, pale yellowish, more or less squamose, the scales broad, dark, quite depressed. Substance fleshy, spongy, much infested with maggots. Pores large, very short, frequently pentagonal, and in some specimens little more than reticulations, whitish or yellowish. Stipes generally extremely short, expanding immediately into the pileus; sometimes, however, in peculiar situations, it is long and branched, but then scarcely producing a pileus: in this state, it is Boletus rangiferinus of Withering.
**Sessile, (sometimes with an excessively short stipes as in P. betulinus).**

† **Pileus sessile or dimidiate, not reflexed.**


*Hab.* On trunks of Beech trees, rather rare. Summer and autumn. Rosslyn woods.

*Pileus* 4–6 inches broad, smooth, when young sometimes with a short stipes, which almost wholly disappears in maturity, fleshy at first, afterwards becoming dry, and some time after gathering remarkably light and friable, pale brown, epidermis separating from the white substance of the pileus. *Form* roundish or subreniform, with a somewhat tumid margin. *Pores* white, unequal, very minute, mouths dentate.—Taste and smell somewhat acid.


*Hab.* On decaying and dead Willow trees. In a wood near Lasswade. Dr Parsons. Foxhall, Captain Wauch. Summer and autumn.

*Pileus* 3–7 inches broad, white at first, gradually changing to brownish, either sessile or dimidiate, horizontal, roundish, convex, margin irregular, smooth, coriaceous or corky according to its substance, which varies in thickness. When dried, light, dry, and hard. *Pores* short, variable, white, at length yellowish-brown. Smell none, or very slight.

I do not think that Persoon is right in making this plant a variety of *P. suaveolens*. Fries, who acknowledges having followed Persoon, without additional data, seems very doubtful whether he is correct. *P. suaveolens* has, according to Bolton, a smell like *aniseeds*; and Linnaeus mentions, that the Laplanders carry it about them when they visit their mistresses, in order to render themselves more agreeable.


*Hab.* On the trunks of Ash, Oak and Sycamore trees; not very frequent. Foxhall, Captain Wauch. Carlowrie and elsewhere. Autumn.

*Pileus* dimidiate, horizontal, very thick, 5–18 inches across, roundish, often irregularly divided into 2 or 3 large lobes, convex, very villose, even shaggy, ferruginous at first, and somewhat orange at the margin, at length black in age. *Flesh* yellow-ferruginous, zoned, difficult to cut, but tearing easily in the direction of the fibres. *Pores* long, yellowish, roundish, pale and fringed at their orifices. *Sporules* bright yellow.

7. *P. fomentarius*, pileus subtriangular, glabrous, dark brown-


*Pileus* large, 3–8 inches in diameter, externally hard, somewhat banded particularly towards the margin, with grey and dark zones, strongly resembling a horse's hoof, sometimes much flattened. *Pores* stratified, or in a succession of layers, long, very slender, naked. *Substance* reddish-brown and spongy.

Much used on the Continent for making *Amadou*; also very generally in the Highlands of Scotland for the same purpose by the shepherds, who manufacture it for themselves.


HAB. Trunks of trees; particularly Plum and Cherry trees. Foxhall, Captain Wauch. Garden at Carlowrie, and elsewhere. Perennial.

*Pileus* somewhat like a horse's hoof, irregular, rugose, banded with convex zones, reddish-brown, at length blackish, smooth, hard throughout, and not fit for converting into amadou. *Pores* very minute, slender, yellowish or greenish-grey, at length cinnamon.—The pileus is apt to change its form, according to its situation; and when growing on the under surface of a horizontal cherry tree branch, it becomes as it were perpendicular, and the pores form a horizontal and circular surface beneath.

†† *Pileus* more or less reflexed, mostly thin.


HAB. On the decaying or dead trunks of Fir trees, especially such as lie prostrate. Woods, Balmuto.

*Pileus* 4–8 inches broad, reflexed, sometimes imbricated, white at first, at length glaucous or blueish, soft and easily injured, but when old rather tough, and at length dry and hard. *Pores* small, white, irregular, often oblique, lacerating, of various lengths. *Flesh* tender, and turning blueish when injured, as does also the surface of the pileus.


HAB. On trunks and stumps of trees, generally close to the ground, not rare. Spring to autumn. Abercorn Park, Duddingston.

More or less imbricated. *Pileus* 2–3 inches broad, velvety, undulated, obscurely zoned, smooth, margin thinner than in the following species, between corky and leathery, margin shrinking and curling inwards when...
dried; colour various, whitish, with a minutely-cottony margin, yellowish-fuscous, or brownish-grey; the latter is the most common. *Pores* whitish or yellowish, minute, round, very short, often disappearing towards the margin.


**Hab.** On trunks and stumps of trees, gate-posts, &c. extremely common. Summer and autumn.

Tufted, subimbricated, coriaceous, thin, at first plane, with the commencement of the pores uppermost, at length reflexed. *Pileus* 1-3 inches broad, velvety, zoned with various colours, margin often naked, smooth, several pilei frequently growing into each other. *Pores* short, white, round.—Whole plant very tough. The most common, and one of the most handsome species of *Polyporus* in this country.


**Hab.** On dead or decaying Fir trees, very frequent. Autumn. Swanston wood; Dundas Hill, &c.

Often imbricated, very thin, tough, white, villose or almost cottony, marked by a few depressed obscure zones, undulated, becoming greenish in decay. *Pores* when young entire, angular, toothed, short, pale violet, in age lacerating in all directions, so as scarcely to retain the character of a *Polyporus*, becoming pale and brownish.—The violet colour is always most bright and permanent at the margin.

††† *Pileus effused and resupinate, (scarcely ever reflexed.)*


**Hab.** Rotten logs of wood and sticks, on the under side; in damp places. Braid Hermitage. Summer and autumn.

Effused, spreading while young over every thing in its way, as leaves, small twigs, and even grass, in the form of a delicate byssus-like web, of reddish-ochrey colour. *Pores* first appearing in the centre, roundish, very unequal. It sometimes grows horizontally from a branch, and not reflexed; in such a case, the surface of the pileus is villose or cottony, reddish-buff. *Flesh* none.—Before the pores make their appearance, this plant might almost be taken for a conferva.


**Hab.** On decaying, prostrate trunks and branches of trees. Spring to autumn. Dundas Hill.
Boletus. CRYPTOGRAMIA. FUNGI. 403

Effused, white, becoming yellowish in age, roundish, tolerably defined, dry, thickish, following in some degree the inequalities of the wood. Pores elongated, roundish, straight or oblique, according to situation. Flesh almost none.


Hab. On decaying wood, and at the bottom of posts, &c. spreading over leaves, &c. Very frequent. The whole year.

Effused sometimes to the breadth of a foot, smooth, not a line thick, not to be separated from the wood without destroying it, margin, when young, very thin and pubescent. Pores straight or oblique, roundish.

There is a variety of this, which Fries thinks may prove distinct. It is very broadly and irregularly effused, thin, white, producing long slender pores, the flesh scarcely half a line thick, but hard and perennial. Hab. On the trunks of Fir trees, incrusting lichens, &c.


Hab. On trunks of Fir trees, especially when in a state of decay. Summer and autumn. Drumshoeland Muir.

Effused, irregular in form, thin, coriaceous, sometimes without but often with a margin, which is white and cottony and rather thick, as if it had a tendency to become reflexed. Pores very short, minute, round, subequal, straight or oblique, and of a fine flesh colour, approaching in some cases to orange. Sometimes small cottony protuberances occur among the pores, which have the appearance of small pilei, with pores underneath.—A beautiful species.

144. BOLETUS. Dill.

* Tubes wholly adnate with the stipes, or decurrent.


Hab. In woods, borders of fields, road-sides, &c. extremely common. Autumn.

This species being the only British one which possesses an annular and permanent veil, it is unnecessary to describe it farther.


Gregarious. Pileus nearly plane, somewhat glutinous, thin, 2-3 inches broad, pinkish or reddish-brown. Flesh white, not changing colour.
Tubes 2–3 inches long, greyish-yellow, at length sometimes ferruginous, slightly decurrent, convex, angular, rather large, irregular, composed of 2 or 3 smaller ones. *Sporidia* pale ochraceous. Stipes 2–3 inches long, about half an inch thick, smooth.


**Hab.** Woods and thickets, common. Dundas Hill, &c.

Pileus at length plane, 1–3 inches broad, moist, or even glutinous, reddish-yellow or brownish. Flesh yellow, not changing colour. Tubes large, subdecurrent, angular, reddish-yellow or ferruginous. Stipes 1–2 inches long, 3–4 lines thick, more or less deep yellow.—Taste remarkably acrid and pungent.


**Hab.** Woods, very common. Newliston woods; Dundas Hill, &c. June—October.

Pileus 2–4 inches broad, more or less convex, of various colours, but chiefly some shade of red, olive or yellow, or their combinations, very dry, tomentose, the surface cracking in age and dry weather into areolae, and sometimes thus variegating the whole surface. Flesh yellowish, changing slightly to blue. Tubes yellowish, large, often somewhat decurrent. Stipes 1½–2½ inches long, very firm, yellow, streaked more or less with red, glabrous, generally crooked, particularly at the base, which is often suddenly attenuated.

This is an edible species, and, according to Fries, plentiful in Europe, Asia, and America.

**Tubes nearly or entirely free; (i. e. not in contact with the stipes).**


**Hab.** In woods, frequent. Dundas Hill. Summer and autumn.

Pileus 2–6 inches broad, very convex, subtomentose, olivaceous, growing darker in age, juicy. Flesh yellowish, instantly changing to blue. Tubes yellow, 1/4–3/4 of an inch long, minute at the mouth, and of a fine crimson-red. Stipes 2–4 inches long, very thick and bulbous towards the base, yellow above, deep crimson or red below, or reticulated with red.—Poisonous; at least to dogs.


**Hab.** In woods, frequent. Near Rosslyn, and probably in many other places about Edinburgh. Autumn.
**Sistotrema. CRYPTOGRAMIA. FUNGI.**

*Pileus* very convex, compact, fleshy, soft, smooth, almost shining, reddish-brown, dingy yellow, cinereous, or whitish, 3–6 inches broad. **Flesh** white, either not changing colour, or slightly reddish, taste grateful. **Tubes** long, white, at length yellowish or greenish. **Stipes** thick, 4–6 inches long, fleshy, subequal, pale or tinged with brown, reticulated. **Sporules** dark ochraceous.


**Hab.** Woods, shaded fields, &c. **Summer** and **autumn**. Swanston wood. Abercorn park and elsewhere.

**Pileus** convex above and below, 2–5 inches broad, humid, somewhat glutinous, sometimes scaly, and sometimes dry and cracked, of various colours, orange-red, brownish, olivaceous, livid, or dark grey. **Flesh** white, either not changing or turning blackish. **Tubes** long, white, minute, obtuse, at length dingy. **Stipes** whitish, long, attenuated above, particularly when close to the pileus, scabrous with dark furfuraceous little scales.—In young plants there is a floccose marginal veil, which is extremely fugacious.

**Div. V. Plants having their hymenium composed of interrupted tooth-like lamellae.**

145. **SISTOTREMA. Pers.**

1. **S. confluens.**


**Hab.** In woods on the ground, and on sticks, &c. Foxhall, Captain Wauch. Autumn.

Gregarious, often anastomosing, or 2 or 3 growing into each other, scentless, brittle, whitish, at length yellowish or tinged with brown. **Stipes** attenuated below, central or lateral, about an inch high. **Pileus** about 1 inch broad, somewhat depressed. The tooth-like plates of the hymenium, entire, or jagged.

**Div. VI. Stipitate, sessile, or resupinate fungi; hymenium consisting of soft conical spines, or subulate processes.**

146. **HYDNUM. Linn.**

* Furnished with a stipes.


**Pileus** irregular, repand, sometimes almost lobed, 2–6 inches broad, smooth, brittle, depressed, margin frequently much rounded. **Flesh** pale, not changing. **Subulate processes** irregular, unequal, mostly entire, but sometimes jagged at the apex, and then, even somewhat hollow. **Stipes** thick, unequal, 1–2 inches long, expanding into the pileus. **Color of**
the whole plant, pale buff, pinkish, or somewhat reddish.—Solitary or
gregarious.

2. H. auriscalpium, pileus coriaceous, tomentose; stipes lateral,

Hab. In fir-woods, on the cones and small fallen branches, extremely
common. The whole year.

So well marked by the tomentose dark coloured pileus, lateral and tomen-
tose stipes (near 2 inches high) of a similar colour, that farther descrip-
tion is unnecessary. The diameter of the pileus is about \( \frac{4}{4} \) of an inch, and
from its colour, is rather difficult to detect.

** Pileus resupinate.

3. H. spathulatum, effused, white, at length yellowish, with
a byssoid margin; processes of the hymenium oblique, suben-
tire, compressed, villose at the apex. Fries, Syst. Mycol. v. 1.

Hab. Prostrate trunks of trees. The whole year. Auchindenny woods,
January.

Effused, roundish or irregular, margin byssoid, delicate, white. Processes
of the hymenium irregular, compressed, mostly entire, smooth, dilated
towards the apex, and villose, white, at length yellowish, oblique.

Div. VII. Substipitate and laciniate, or effuso-reflexed or re-
supinate plants. Hymenium warty, minutely hairy, pap-
pillose or smooth. (Thelephorideae.)

147. THELEPHORA, Pers.

* Pileus striato-fibrous; either furnished with a sort of stipes
or sessile. Growing on the ground.

1. Th. caryophyllea, somewhat tufted, stipitate or sessile;
pileus irregular, rarely quite entire, striato-fibrous, purplish-

Hab. On the ground, or attached to roots, branches, &c. in contact with
the ground, especially in fir-plantations, very common. Autumn.

A variable plant, having sometimes an entire funnel-shaped pileus, with a
stipes \( \frac{4}{4} \) of an inch high, at others, sessile and imbricated with an ir-
regular, almost horizontal pileus. The upper surface is always more or less
fibrous, and sometimes marked by one or two obscure zones; but the
margin is not so constant, being often only slightly villose or strigose,
while in some varieties it is almost laciniate. Hymenium somewhat
smooth, obscurely veined, minutely papillose, and much the same colour
as the superior surface. Substance thin and coriaceous, and, like all the
Thelephora, preserves its character in drying.

2. Th. terrestris, irregularly tufted, dark fuscous; pileus

**Hab.** On the ground in woods, among fir-trees. Swanston wood.

Very irregular in its growth. *Pileus* thickish, dark dingy brown or even blackish, strigose, very rarely with a stipes, but growing at once from a mass of dead fir-leaves and sticks. *Hymenium* mostly resembling the preceding, of which indeed this may be a variety. The much thicker pileus is one of the chief diagnostic marks, and the figure given by Nees in his System, is very characteristic.

**Effused, at length decidedly reflexed and horizontal.**


**Hab.** On stumps of trees, generally in contact with the ground. Autumn and spring. Auchindennay woods. Braid Hermitage. Rare.

*Pileus* very irregular, mostly imbricated and sublobed, or even waved at the margin; a large portion generally remaining effused. The upper surface is zoned, and rather pale; the *hymenium* pale buff, smooth, more or less papillose, turning in age to a dingy ferruginous colour. When in a favourable situation near the ground, it produces occasionally several short stems, which expand into irregular pilei, frequently anastomosing with each; but these stems appear to be rather the effects of luxuriant growth than a permanent character of the plant. It is a large species.


**Hab.** On stumps and branches of trees, prostrate trunks of trees, &c.; extremely common. Perennial.

Frequently much imbricated, but often attached in one reflexed pileus for many inches long, on small prostrate branches; hairy and strigose, zoned, margin entire, lobed or waved, thin and coriaceous. *Hymenium* very smooth, buff-yellow or somewhat orange. The colour, however, of the *hymenium* is apt to vary in shade.


In a young state circular, with the margin slightly thicker and paler; when older it becomes reflexed, white, substrigose, marked with brownish depressed zones. *Hymenium* smooth, purple, becoming pale or brownish in drying.—The individual plants are about one inch in diameter; but by a number growing together, a space of several inches long is frequently covered.


Several inches broad, many growing together and into each other, while young entirely resupinate, with the hymenium subvelvety, rubiginose, margin pale, thin, circular; when old reflexed, the reflexed portion more or less zoned or banded, glabrous, unequal, dingy and blackish. *Hymenium* minutely velvety, smooth, reddish, with a purplish tinge, becoming dark ferruginous in age. Substance very coriaceous, hard and rigid.—Sometimes it is resupinate from first to last, but this is rare.

***Resupinate or broadly effused, the margin more or less free, and sometimes a very small portion reflexed.***


Generally entirely resupinate, but the margin sometimes subreflexed, brown, marked with 2 or 3 narrow zones, resembling thin layers of the pileus overlaying each other, margin entire, sometimes slightly thickened. *Hymenium* smooth, but unequal, with rounded protuberances, (apparently from the inequality of the surface beneath), intermixed with papillae.—Whole plant several inches broad, but when growing on the small branches, it sometimes almost entirely surrounds them, becoming interrupted at intervals, and slightly reflexed. The surface is not unfrequently cracked.

8. Th. ochracea, effused, very broad, thin; hymenium somewhat of an ochrey pale yellow, smooth, or with scattered unequal false papillae. Fries, Syst. v. 1. p. 446. Pers. Mycol. v. 1. p. 137.


Covering a large surface, being often a foot broad or more, mostly resupinate, but sometimes slightly reflexed, or rather detached at the margin, adhering closely to the wood, margin entire in old plants, but villose when young. *Hymenium* smooth, ochraceous, sometimes with a faint purplish tinge, papillae rather large, irregular and spurious, being produced by the asperities of the wood.—It resembles some states of the preceding species.

9. Th. radiato-rimosa, resupinate, margin free, whitish, hirsute; hymenium fuscous, smooth, somewhat shining, and faintly zoned towards the margin, cracking in a radiated manner.


About 3 or 4 inches broad, subcircular, growing into, or overlaying each other, thin, resupinate, margin free, whitish, somewhat cottony, entire. *Hymenium* smooth, reddish-brown or fuscous, rather paler towards the
margin, which is somewhat glossy, and faintly marked with narrow zones, the surface splits in age, in a direction from the centre to the circumference, and often completely through the whole substance, producing the effect of having been cut with a knife.


HAB. On decaying and dead trunks of fir-trees, frequent. Braid Hermitace, in November.

From 1–2 inches broad, very gregarious, confluent, thin, closely following the inequalities of the bark, minutely byssonid, especially in the young state. *Hymenium* whitish or pale brownish, with a light purplish bloom, sericeous or silky, with minute adpressed hairs, particularly at the margin, uneven from the inequalities of the bark, turning to a blood-red colour when scratched or wounded.—Very few minute papillæ or none.


HAB. On dead trunks and branches of trees. Woods about Edinburgh in autumn. Rare.

Several inches long, the breadth depending on the size of the branch to which it is attached, thin, coriaceous, much resembling buff kid-leather, margin free, hisrute, with a few band-like depressions. *Hymenium* light buff or whitish while young, becoming dark in age, with a ferruginous or reddish tinge, minutely reticulated.—I have not observed any papillæ on this species.


HAB. Branches, chiefly of oak-trees. Autumn and winter. Auchindennoy woods.

About 1 inch broad, with a very flexuose and free, but not reflexed margin. When several grow together, they are apt to become confluent. *Hymenium* in old plants much cracked and divided; very irregularly tuberculose; tubercules sometimes very large and rounded.

**** Wholly resupinate, effused, substance various.

† *Hymenium* dull flesh-colour, cinereous or purplish brown.


Spreading along dead branches for several inches, rigid, easily broken, very dark, even black, and not fibrous underneath. *Hymenium* flesh-colour, sometimes reddish or approaching to orange, rugose, very papillose towards the centre, cracking in age, and the margin often revolute.—It
Generally attaches itself to the smaller branches, and is therefore narrow in proportion to its length.


Commencing in the form of a minute tubercle, which gradually expands to a line or two in breadth, when it begins to assume the character of a thelephora, and is papilliform in the centre; it increases to the diameter of an inch or more, and becomes confluent with others; it is thin, effused, very liable to crack into distinct portions in age and dry weather, and has a tendency to become involute at the margins. Hymenium greyish or purplish-brown, farinose under a pocket lens, and rather regularly papillose.


Effused, very adnate, extremely thin, form irregular, margin remarkably adpressed, minutely villose, but not invariably so. Hymenium cinereous or purplish-grey, somewhat brownish in age, glabrous, very papillose, but the papillæ unequal, small.

†† Hymenium very pale yellowish or buffish.


Effused, irregular, 2 or 3 inches broad, but the byssoid margin seems to proceed without any regularity, extremely thin, and following all the inequalities of the bark. Hymenium smooth, very pale yellowish-buff, scattered over with a few rounded papillæ, or quite plane. In drying the substance is inclined to crack, and the fracture is byssoid. The papillæ, especially the large ones in many species, seem to owe their origin to the asperities of the surface on which the plant grows. Papillæ are thus formed in several species by incrusted sphaerio; in my specimen of Thel. epidermea, they are formed by an incrusted stilbospora.


HAB. On the ground, and on the mossy trunks of trees, not unfrequent after much rain. Braid Hermitage. Autumn.

Plant 1-4 inches broad, soft, fibrous at the margin, spreading over mosses and culms of grass, small twigs, or any thing which lies in its way, and often so completely enveloping them as to make them resemble minute stalactites. Hymenium smooth, very irregular and uneven, tuberculose and papillose.
Hymenium white, discoloured only in extreme decay.


*Hab.* On decaying wood and trees; frequent. Braid Hermitage, on a dying elm-tree. Autumn.

Unequal in thickness, effused, hard, extending over several inches. Hymenium white, discoloured in age, much cracked, papillose, sometimes, however, quite plane and smooth.


Very thin and membranaceous, of a chalky whiteness, and often lining the small hollows in decaying elder-trees, growing indiscriminately on the bark and wood.

148. **MERISMA.** *Pers.*

*Subdecumbent, laciniate.*


*Hab.* On the ground, among mosses in woods. Autumn. Craiglockhart.

Effused when young, and incrusting the moss among which it grows, at length producing expanded, compressed, broadly-branched fronds, elegantly fimbriated or laciniate at the margin. Colour pale grey, becoming yellowish in age, and of a firmer substance.

**Erect, much branched.**


*Hab.* On the ground in woods. Autumn. Balmuto.

Plant 1-4 inches high, rich purplish-brown, much tufted, branches crowded, plane and palmate towards the summit, which is paler, often whitish, minutely pubescent. In age becoming blackish.—Smell abominably bad a few minutes after gathering.
Div. VIII. Erect, filiform or club-shaped, simple or branched plants, of a carnose substance. Pileus and stipes confluent or obscurely distinct. Hymenium smooth, occupying more or less of the whole surface.

149. CLAVARIA. Vaill.

* Much branched.


1-2 inches high, but seldom more than one, moist, viscid, according to Fries. Branches geniculate, short, obtuse, fasciculated, often crowded, frequently somewhat incrassated at the summit, which is probably owing to the commencement of young branches.


Plant 2-4 inches high, solitary, branched in a straggling but dichotomous manner, dry, very smooth, except at the base, which is somewhat tomentose. Branches elongated, slender, attenuated, often subcompressed, some acute, others obtuse, often rounded at the axils.


Hab. In fir-woods, or under fir-trees. Autumn, rare. In a wood at Balmuto.

Plant gregarious, 1½-4 inches high, compact, shrub-like. Summits of the branchlets attenuated and acute, frequently forked, but so minutely as to appear like subulate teeth. It is extremely well marked, by changing to a green colour, if bruised or injured, and also when submitted to pressure in drying.

HAB. On the ground in shaded places, and after much rain. Occasionally about Edinburgh in the autumn.

Very smooth and white, but sometimes with a violet tinge at the base, according to Fries. 2-4 inches high, and the only white branched species with acute summits in this neighbourhood.


Plant 1-3 inches high, polymorphous, variously branched, and always dilated or somewhat deformed towards the summit, which is more or less jagged, laciniate or fimbriate. Colour mostly white, sometimes cinereous and dingy.

A variety of this plant is sometimes infested with a parasitic minute black-spherea.


HAB. On the ground, in woods or among grass in moist or shaded places. Very frequent. Foxhall and Newliston woods, Captain Wauch. Balmuto.

Plant 1-4 inches high or more, solitary or gregarious, tufted, much branched, pale, cinereous, blueish or purplish-grey, or even somewhat of a purplish flesh-colour. Stipes very short; ½-1 inch thick, dividing immediately into several thick irregular branches. Branches unequal, rugose, smooth, often producing a number of little incrassated divisions; summits somewhat dilated, subcompressed, mostly obtuse, and knobby or even very bluntly palmate. Sometimes, however, the branches are unequally cylindrical, and terminate somewhat acutely.


HAB. On prostrate and decaying fir-trees, and on fir-timber in damp places; springing out of the cracks in the wood for several inches together. Autumn, very common.

From ½ to 1 an inch high, orange-yellow, simply branched, branches somewhat acuate, when very young soft, when old, dry and quite corneous.

** Simple, rugose, often obtusely divided at the summit into a few processes resembling branches.

Hab. On the ground in woods, and in moist shaded places. Autumn. Very common.

Plant 1–3 inches high, white, rugose, not very brittle, solid, at length hollow in old plants, smooth, incrassated or very club-shaped, obtuse, simple, or with the summits divided into a few obtuse processes or deformed unequal branches.—Intermediate between the branched and simple Clavaria.

*** Simple.  


Plant 1–3 inches high, somewhat tufted or gregarious, of various sizes and forms, fragile, compressed or angular, or channelled, often bifid, and variously cut or jagged at the apex, more or less ventricose in the centre, smooth and mostly yellow, though occasionally whitish.


Hab. Meadows and pastures and moist ground. Autumn, frequent.

Plant 1–2 inches high, about 1 line thick, almost linear, somewhat flexuose. This plant appears to be rather confused in its varieties, as enumerated by Persoon. But I have no recent specimens by me, and without them it is impossible to decide.


Plant 2–4 inches high, growing in crowded tufts, and though always simple upwards, yet from juxtaposition often somewhat connected at the base, yet evidently not branched, solid, with a small perforation; very white, cylindrical, subulate, and mostly tinged with yellow at the apex, which is also more or less flexuose, sometimes incurved. It is occasionally subcompressed and furrowed, the substance fibrous. Fibres under the microscope large and jointed.


Plant 1–2 inches in height, gregarious, and sometimes in tufts of 3 or 4 together, often scattered, much attenuated towards the base, cylindrical.
or subcompressed, either solid or minutely hollow, rather firm between the fingers, but remarkably brittle, smooth while young, but rugose in age, of every shade from white to yellow; in this part of the country I have not seen a single white specimen. It is often crooked.

13. Cl. uncialis, white, gregarious, round, club-shaped, obtuse, much attenuated at the base, smooth, not brittle.

**Hab.** On the dead stems of the larger herbaceous plants, rotten twigs, &c. Autumn. Foxhall, Captain Wauch.

*Height* various, rarely exceeding one inch. Whole plant white, becoming tinged with yellow in decay, very gregarious, but not cespitose, straight or very slightly flexuose, regularly incrassated upwards, and obtuse at the apex, smooth, and attached at the base by a few minute white fibres.

This species cannot be confounded with the preceding, the difference of habitat being alone sufficient to distinguish it. It approaches very near to *Cl. virguliformis* and *Cl. tortilis* of Persoon; but from the former it differs in being incrassated upwards, villose at the base, and in being much shorter; from the latter, in not having a dark coloured and twisted stipes.

14. Cl. stipes, white, minute; hymenium oblong or ovat-clavate, passing suddenly into a filiform pilose stipes. *Cl. trichopus*, Grev. Crypt. Fl. t. 49.

**Hab.** On dead leaves, &c. in woods and moist places. Balmuto. Autumn.

White, 1–2 lines high, gregarious. *Stipes* filiform, pilose, occupying about two-thirds of the plant, suddenly dilated into an obtuse, oblong or clavate, smooth hymenium.—The name of *trichopus* is preoccupied.

150. PHACORHIZA. Pers.


**Hab.** On the ground in woods, walks, &c. among dead grasses, &c. Autumn. Balmuto.

Elongated, filiform, 2–3 inches long, smooth, straight or flexuose, mostly simple, but in abortive plants growing beneath a covering of dead leaves, frequently much branched and entangled, and 4 or 5 inches long, the branches extremely fine *.


**Hab.** On sticks, leaves, or often springing from within decaying culms of grasses, and thus concealing the tuber. Autumn. Balmuto.

* I have extended Persoon’s genus *Phacorhiza*, and made it include all those claviform plants which arise from a radicular tuber.—See Scott. Crypt. Fl. t. 43.
Whole plant scarcely more than half an inch high. **Hymenium** 2–3 lines long, white, cylindrical, smooth. The stipes is much thinner, dark, pinkish, filiform, arising from the centre of a depressed, rugose, blackish tuber, about 1 line in diameter.

151. **GEOGLOSSUM.** Pers.


**Hab.** On the ground in woods, bogs and meadows. Autumn. Foxhall, Messrs Wauch and Greville.

Two to three inches high, hymenium plicate, the margin prominent.


**Hab.** In moist meadows, pastures, &c. in autumn. Foxhall, Captain Wauch.

A small species, 1-1½ inches long, cylindrical, very slimy when young, and in moist weather. **Hymenium** very confluent with the stipes, somewhat incrassated towards the summit. **Stipes** about 1 line thick, olive-black at the base.

**Div. IX** Pileus and stipes distinct. **Hymenium** on the external surface of the pileus, which is either even, undulated, or furnished with large cells. (Helvelloideæ.)

*In the genus Phallus, the cells of the pileus are only visible after the slime which contains the sporules has fallen.—Not strictly belonging to the Helvelloideæ.*

152. **LEOTIA.** Pers.


**Hab.** In bogs, wet ditches, &c. among brush-wood, on dead leaves, or on the ground among moss. May—August. Ravelrig-toll Moss among the willows.

Gregarious, fragile, smooth, hollow, and often filled with water. **Stipes** about 1 inch long, whitish or pale yellow. **Hymenium** very variable in figure, 2–4 lines long, fine orange-yellow. It preserves beautifully, if submitted to slight pressure.

Helvella. Cryptogamia. Fungi. 417

Clavaria ferruginea, Sow. Fung. t. 84. M. Heyderia pusilla, Fries, Syst. v. I. p. 493.

Gregarious, ½-1 inch long, dry, growing among dead fir leaves. Stipes flexuose, dark, firm, slender, smooth, but somewhat tomentose at the base.


Gregarious, almost tufted, 1-3 inches high. Pileus ⅔ of an inch broad, of a gelatinous substance, thick, at length collapsing, and becoming thin and corneous when dry. Stipes 2-3 lines thick or more, solid, yellowish-green, changing in age to orange-yellow, passing into the pileus.

153. Helvella. Linn.


Plant 2-5 inches high. Pileus mostly very dark but sometimes of a pale grey-brown; much deflexed, and more or less united to the stipes, which is the chief distinguishing mark. Stipes hollow, variously sulcate. This plant is very frequently distorted or monstrous. The diameter is even sometimes greater than the height, apparently from the union of 2 or 3 contiguous plants. Helvella Mitra of Sowerby is the following.


About the same size as the preceding. Stipes somewhat bulbous, or ventricose towards the base. Pileus quite free, generally more or less lobed, sometimes even crisped, yellowish-white above, pale brownish beneath.


CRYPTOGAMIA. FUNGI. Phallus.


Plant 1–4 inches high. Pileus cellular, like a honeycomb, of a roundish form, and closely contracted round the stipes. Stipes hollow, white.—The whole plant has an agreeable smell, and is well known as the common eatable Morelle.


Hab. Woods, in the spring. Foxhall, Captain Wauch.

Plant 3–5 inches high. Pileus short, and acutely conical, forming nearly an equilateral triangle, more wrinkled and ribbed than cellular, main ribs running somewhat obliquely from the base to the apex of the pileus. Stipes equal, white, hollow, passing into the pileus half-way between the base and the apex, much longer than in the other species of the genus.

155. PHALLUS. Mich.


About 6–8 inches high. Volva before bursting as large as a hen’s egg, but rounder; and several are connected with each other by a kind of running root. Growth wonderfully rapid. The slimy matter which contains the sporules is greedily devoured by flesh-flies; so that the pileus is most frequently seen with the cells perfectly empty. Smell abominable, but far worse at a distance than when the plant is in the hand. It is known by the names of Stink-horns, and Stinking Morelle.

Div. X. Plants of various sizes, sessile or stipitate, more or less cupuliform (always so when young). Hymenium occupying the superior surface. (Pezizideæ.)

156. PEZIZA. Linn.

* Large, carnoso-membranaceous, fragile, externally sulfurinaceous.

† Sessile; sometimes split and convolute.


A very splendid species, \( \frac{3}{4} - 1 \) in diameter, remarkably brittle, often much crowded; sometimes split, but rarely with the split edges rolled in.


Very large and brittle, 1-3 inches high, 2-3 in diameter, cracking and convoluted. It is not rare in Scotland.


**Hab.** On dunghills, roofs of cottages, &c. Autumn.

Often much crowded, or densely cæspitose, 1-3 inches high, and as much in diameter. *Month* when young much contracted, but expanding in age, with a tendency to split; never, however, becoming involute at the split margin. *Hymenium* pale dilute yellow-brown. *Substance* carnose, composed of two plates, with a hollow in old and large plants.


**Hab.** On the ground under Beech trees. Autumn. Foxhall, Messrs Wauch and Greville.

Large, 1-4 inches broad, carnose, brittle, gradually expanding till it frequently becomes quite plane, sometimes splitting at the edge, waved, somewhat lobed. *Margin* somewhat reflexed. *Base* beneath, often plicate and radicating. *Pileus* when splitting never involute.

†† *Furnished with a stipes.*


**Hab.** Woods in the autumn. Balmuto.

Well marked by its long stipes, 2-4 inches high. *Stipes* about 2 lines thick, cylindrical, even or pitted, solid. *Pileus* \( \frac{1}{4} - 1 \) inch in diameter, concave. *Hymenium* darker than the rest of the plant. *Flesh* very white.
** Mostly small and sessile, carnose, externally hirsute, tomentose, pubescent or merely ciliate at the margin.

† Externally hairy.


HAB. On rotten wood; old cow-dung; on the ground among short moss, &c. Very common. Spring to autumn.

A very beautiful plant, 2-4 lines in diameter. Hymenium bright orange-red, margin somewhat raised, sometimes in full grown plants almost quite plane. Externally reddish-buff, and hispid with stiff, black, rather long hairs, but not thickly set.

7. P. albo-spadicea, sessile, gregarious, globose, at length quite plane; external surface and margin strigose with reddish-brown hairs; hymenium white.


A fine species, about 2 lines broad, globose when young, gradually becoming plane. Hymenium white, smooth, with a slight tinge of grey in moist weather. External surface covered with reddish-brown hairs, which form also a border to the hymenium. Tubular theca containing 8 sporules.


HAB. On the decayed stems of the larger herbaceous plants in autumn. Very common on dead nettle stems.

About 1 line broad when full grown. While young, the plant resembles a minute strigose yellow ball; and it is often long in expanding, sometimes probably never doing so. The colour of the hymenium and the outer surface is liable to trifling variation.—Sowerby’s plant may be a distinct species, but somewhat resembles ours in a young state.

9. P. plano-umbilicato, small, sessile, gregarious; whole plant white, globoso-concave, at length quite plane, ciliate with horizontal white hairs at the margin; hymenium gently umbilicated.


Of the same size as the preceding, wholly white, remarkably plane, with a small dimple in the centre of the hymenium, which in old age gains a yellowish tinge. The external surface (by which is always meant the reverse of the hymenium), covered with white hairs, which form a beautiful ciliated margin, not in the least raised. The margin is so regular, that if there had been fewer cilia, it might have been called pectinate.

10. P. nidulus, sessile, gregarious, very minute, orbicular, somewhat depressed, substrigose, brown or nearly black. Kunze.

Hab. On the decayed stems of the larger herbaceous plants. Autumn.

Extremely minute, even punctiform, coriaceous, subhirsute, apparently becoming more so in old age. The German specimens were first found on Convallaria multiforma. It grows, however, on several Umbelliferae in this country.

† † Externally pubescent or tomentose.


Hab. On dead branches of trees in woods, in spring. Rosslyn woods; rare.

Solitary or subgregarious, 1/4-1 inch in diameter, turbinate or somewhat funnel-shaped, carnose. Stipes thick, very variable in length, sometimes above an inch.—A very rich and beautiful species, and still considered rare.


Hab. On the fallen branches and twigs of trees in woods. On hawthorn and oak branches, according to Persoon; most plentiful in this country on larch twigs.

Rather variable in the colour of the hymenium, and in being sessile or furnished with a short stipes; but always villose and delicately white on the external surface. The mouth is also pretty constantly contracted or only partly open. It is a small species, scarcely 1 line broad, but very beautiful.


Hab. On rotten sticks, and dead twigs, &c.; in woods and hedges. Autumn. Slateford, &c.

Stipes about a line long. Pileus very white and delicate, scarcely more than a line broad, delicately villose, globose, becoming hemispherical, with the margin at length somewhat spreading.


Very minute, and only open in very moist weather; frequently much
crowded, ¼ to ½ a line in diameter. The most common appearance is that of a very minute villose globe.


**Hab.** On rotten wood, chips, &c. In damp woods. Autumn.

Subglobose at first, becoming gradually concave, at length nearly plane, margin at first connivent, afterwards somewhat raised, thin and subinvolute. A small species scarcely 1 line broad.


**Hab.** On decaying dry wood, sawn stumps of trees, &c. Spring to autumn. Very frequent. Slateford, Rosslyn, Auchindenny, &c.

Gregarious, often much crowded, scarcely a line broad, sessile, or with a very short thickish stipes. In a dry state it has a very pulverulent olivaceous appearance, and without form. It occurs mostly on hard stumps which have been sawn, rarely on scattered branches.

††† Margin ciliated, or furnished with elongated teeth.


**Hab.** On rotten sticks and stems of large herbaceous plants. Autumn. On dead nettle stems, Foxhall, Captain Wauch.

Gregarious, 1-2 lines or more in diameter, 3-4 lines high. *Stipes* somewhat curved. Whole plant either white or tinged with yellow.

*** Externally glabrous; carnoso-ceraceous, or somewhat gelatinous.

† Stipitate.


**Hab.** On rotten sticks and branches. Autumn. Balmuto.

Gregarious. *Pileus* funnel-shaped or cyathiform, at length spreading and often plane, glabrous, margin rather thin, even, ¼-½ of an inch broad. *Stipes* ½ to 1 inch long, not 1 line thick, sometimes very flexuose and filiform, rather paler and more yellowish than the hymenium, but dark or even blackish towards the base.


Pileus 1–3 lines broad; hymenium plane, but the form of the pileus is ob-conical from the thickness of its flesh; the colour varies from white, or pale yellow, to a reddish hue, particularly in age. Stipes flexuose, pale, filiform, attenuated downwards.


HAB. On rotten wood, dead branches and twigs. Autumn, frequent.

Stipes about two lines long, thickening upwards, and passing into a solid funnel-shaped pileus. Hymenium scarcely concave, 2–3 lines broad.


Extremely delicate, membranaceous, white or slightly yellowish, mouth widely open, without being expanded, unequal. It varies greatly in size on the same twig, the larger being 2 lines in diameter, the smaller not 1 line.


HAB. On decaying, and chiefly sawn stumps of trees. Autumn. Foxhall, Captain Wauch.

Variable in size and form, sometimes attaining 1 inch in diameter. Stipes rude, and often irregular, frequently resembling an abrupt termination of the pileus. Substance subgelatinous, tremellose, yet somewhat firm. The following varieties are enumerated by Schmacher, and given in Persoon’s Mycologia.

β. obconica, small, substipitate, pileus obconical, margin acute, waved, cre-­nate, externally subvenose; hymenium somewhat concave.

γ. loxata, subsessile, pileus lobed; lobes oblongo-ovate, rounded or retuse, erect or decumbent, externally subvenose; size various. *Tremella dubia, Pers. Syn. p. 630.*

δ. turbinata, substipitate, turbinate, glabrous, margin smooth.

ε. cylindrica, caespitose, small, subcylindrical, glabrous, margin raised; hymenium somewhat concave.

ζ. labyrinthiformis, lamelllose, cellulose; lacunæ or pits unequal.

Wherever this species occurs, some of the above varieties will probably be present. I do not know a more polymorphous plant.

†† Sessile or subsessile.

23. *P. cribrosa*, black, solitary, rather large, very concave;
hymenium cribriform, or full of lacerated irregular pores or sinusus.

_Hab._ On the ground, in sandy or gravelly places among short grass. Autumn. Balmuto.

_Large_, 1-1 inch broad, hemispherical, at length partly spreading, but always deeply concave, wholly black, but deeper within, somewhat rugose at the base externally; margin entire, even.

In 1821, this species was discovered by Dr Hooker and myself, in crossing from the west coast of Scotland to Inverness. Those found at Balmuto are precisely the same, but larger. All the specimens I have seen possess the remarkable porosity of the hymenium, which, however, does not appear to be the consequence of regular organization, but to arise from the contraction of the hymenium. This part in drying cracks variously in many species; but in _P. abietina_ it often assumes a porous character; whence a variety of it has been made a species by Persoon, in his _Synopsis_, p. 610. _P. porosa_, "disco demum foraminulosa."


_Hab._ On the sawn stumps of trees, and fallen branches. Autumn, very abundant.

Extremely gregarious, of various sizes, intermixed with each other, almost confluent. _Pileus_ 1-2 lines broad, hymenium scarcely concave when full grown. _Stipes_ very short, thick, obconical. _Substance_ carnoso-ceraceous, firm, thickish. Whole plant bright pale yellow.


_Hab._ On posts and rails, trunks of trees, &c. Autumn. Very common.

Numerous, often in long lines, even confluent, scarcely a line broad, nearly plane. When dry concave, and of a thin, somewhat corneous substance.

26. _P. clarofoiava_, yellow, gregarious, minute, obconical, at length somewhat plane, margin raised, obtuse, externally somewhat paler.


Very minute, the largest not half a line broad, always concave. Whole plant very bright yellow, hymenium darker.

27. _P. punctata_, yellow, very minute, gregarious, punctiform, globular, at length plane or subconvex, margin minutely crenate. _Grev._ Crypt. Fl. t. 63.

_Hab._ On dead oak and beech-leaves in autumn. Balmuto.

Very distinct. Bright yellow, but one of the most minute species.

28. _P. herbarum_, white, gregarious, carnose, at length con-

Hab. On the decayed stems of the larger herbaceous plants, especially Urtica dioica. Autumn.

Scarce one line broad, terminating at the base in a point somewhat resembling a stipes. Often very crowded, so as to affect each other's shape, and consequently the pileus is frequently waved.


Resembling white dots; subsessile. Persoon says it grows also on the bark of fir-trees.


Crowded, 1-2 lines broad, either equal, or lobed and waved at the margin. Hymenium pale or dark grey, watery, paler towards the circumference. Substance soft, and sometimes almost gelatinose.

31. P. ochracea, ochrey-brown, minute, gregarious, carnose, thick, obconical; hymenium minutely granular; at length plane or subconvex. Grev. Crypt. Fl. t. 5.


Not 1 line broad, thick, puckered or rugose at the base, margin equal or subirregular, rounded and depressed. Hymenium sprinkled with minute shining particles resembling grains of brown sugar. In drying it does not change.


Mostly crowded; not a line broad; when young globular and deep green, at length concave or plane, and turning black. Substance gelatinose, soft.

**** Coriaceous, mostly black, bursting from the bark of trees.


Hab. On the trunk and branches of Prunus domesticus and spinosus, Autumn and winter. Auchindenny woods.
It bursts transversely on the branch, and is so much crowded or fasciculated as to render each other flexuose. About 1 line broad; accompanied sometimes with subulate processes resembling those of some speriae, which are not yet satisfactorily understood.


Hab. On the fallen trunks and branches of the common cherry. The whole year. Rosslyn woods; Slateford; Newliston woods, &c.

This species has also the speraria-like subulate ostiolar intermixed. *Pileus* 1 line broad; *hymenium* gently convex, black, furnished with a regular narrow border. External surface paler.


Hab. On dead branches of *Sorbus aucuparia*. Autumn. Craiglockhart. Not 1 line broad, forming tufts 3–5 lines in diameter. The subulate bodies in this instance appear clearly to be abortive plants.

157. ASCOBOLUS. *Pers.*


Exactly like a peziza, but in mature plants the surface of the hymenium becomes dotted by the black protruding summits of the cells containing the sporules. About 1–2 lines broad.

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XIII. GASTROMYCI. *Link., Grev.*

Div. I. *Plants of a soft gelatinous substance, mostly uniform, solid, variously folded. Sporules imbedded throughout the substance or towards the surface.*

158. TREMELLA*. *Dill.*

* Large.


Hab. On fallen branches of various trees, common. Autumn to Spring.

Plant of a fine bright colour, 1–3 inches broad, roundish or depressed, very

* No genus requires more revision than Tremella; but not having been able to procure specimens of all the British species for microscopical examination, I have continued them for the present in their old situation. *T. clavariaformis*, deliquescens and cruenta, certainly do not belong to the genus.
Tremella. Cryptogamia. Gasteromyci. 427

gelatinous, yet rather tenacious, shrinking much in drying, when it becomes horny and of a darker colour.


Half an inch to one inch broad, tender, semipellucid, clustered, at first strongly resembling the brain of an animal, at length yellowish, and, according to Bulliard, even sometimes blackish.


Hab. On dead trees, and even decaying sticks. Autumn. Auchindenny woods, and at Carlowrie.

One to three inches broad, an inch thick, very gelatinous, pale, at length brown or blackish; the upper surface flatish, undulated, sporuliferous.


Hab. On rotten wood. Autumn to spring, not unfrequent.

Much resembling Peziza sarcoides, but more irregular in form. Clavate at first, at length obconical, variously lobed and somewhat clustered, the larger specimens being an inch in diameter. Substance elastic, and somewhat tenacious. Black in old age.


Not an inch long, about 2 lines thick, semipellucid, pulpy and tender, within almost colourless. Apex often somewhat thickened and minutely granulated. Certainly not T. Subini of English Botany.

** Small.


Hab. On rotten wood, old pales, gate-posts, &c., very common.

One to two lines broad, very soft, yielding to the slightest touch, slightly plicate at the base.

CRYPTOGAMIA. GASTROMYCI. PUCCINIA.

HAB. Damp walls near the ground. Frequent in Edinburgh. Autumn to spring.
A fine dark purple colour is all that is perceptible to the naked eye; but the plant often covers a large space. Granules round, subpellucid under the microscope.

DIV. II. Parasitic plants produced under the epidermis of vegetables (chiefly the leaves), and bursting through it. Sporidia free or fixed by a pedicel, never mixed with filaments.

159. PUCCINIA. Mich.

* Sporidia many-celled.


HAB. On the inferior surface of various roses, particularly *Rosa canina*, and *R. centifolia*. Autumn. Very common.
This species so often accompanies *Uredo Rose*, growing even from the midst of it, that it was once thought to be parasitical upon it.


HAB. On the inferior surface of the leaves of *Rubus fruticosus* and *corylifolius*. Autumn, very common.
The presence of this species is generally indicated by a dull red stain on the upper surface of the leaf. It is more compact than the preceding.

3. **P. gracilis**, hypophyllous; tufted, of various sizes, black, rather lax, scattered; sporidia 7–9-celled, somewhat attenuated, mucronate, with a slender stipes, incrassated at the base. P. Rubi Idæi, De Cand. Fl. Franc. v. 6. p. 54.

A very distinct species, differing in the greater number of dissepiments, both from *P. Rubi* and *P. Rose*; from the latter also in the absence of the yellow gland at the base of the stipes.
I have given it the name of *gracilis*, in order to avoid the inconvenient double specific appellation of De Candolle.


HAB. On the under surface of the leaves of *Potentilla Fragaria, argentea*, and *Tormentilla erecta*. Autumn. Near Edinburgh; Rosslyn, &c.
Puccinia. Cryptogamia. Gasteromyci. 429

Very distinct from P. Rosé, in the small number of dissepiments, the wholly filiform stipes, and absence of the yellow gland at the base. It is frequently accompanied by Uredo Potentilla.

** Sporidia 2-celled.


Hab. On the dead stems of Asparagus and Cabbage plants. Autumn. Rare about Edinburgh.

It sometimes becomes confluent, and forms longitudinal lines of half an inch in length.


Hab. On the inferior surface of the leaves of Circaea lutetiana and alpina. Autumn. Rosslyn woods.

Each tuft is composed of a number of very small ones contiguous to each other, yet scarcely becoming confluent, in which it resembles only one other, a new species growing on Aster macrophyllus in N. America. Colour of the upper surface of the leaf pinkish, sometimes with a pale yellowish border.

7. P. Chrysosplenii, hypophyllous, small, of various sizes, few together, and confluent, pale brown; sporidia long, somewhat waved, much attenuated at each extremity, with an elongated stipes. Uredo Circaea, Strauss, in Annal. Soc. Wetterav. v. 2. p. 110.


This species certainly resembles P. Circaea in the form of the sporidia, except that they are more acute, and furnished with a longer stipes; but here the resemblance ends. The remarkable dense, convex, and heaped character, so striking in P. Circaea, as well as its dark colour, is quite wanting in the present plant.


Hab. On the under surface of the leaves, and on the stem of Polygonum aviculare. Not uncommon in the autumn, about Edinburgh.

When it occurs on the stem, the form of the plant is oblong or linear. It is often accompanied by Uredo Polygonorum.

9. P. Ægopodii, chiefly hypophyllous, minute, aggregated, rendering the nerves and petioles swollen, dark blueish-grey before bursting; sporidia nearly black, oval, not contracted in the


It occasionally appears on the upper surface of the leaf, but generally confines itself to the petiols and nerves on the under side, which it renders deformed.

10. *P. tumida*, hypophyllous and on the petiols, conglomated, confluent, brownish-grey before bursting; sporidia nearly black, obtuse, scarcely contracted in the centre, the upper cell sometimes subdivided.

HAB. On the leaves, stem, and petiols of *Bunium bulbocastanum*. Spring. Balmuto.

This species produces great deformity on whatever part of the plant it grows, but especially on the petiols, which it often completely surrounds; the whole mass being then several times thicker than the natural diameter of the part. The *Sporidia* vary in thickness, but are all very obtuse at the summit. *Stipes* very short.


HAB. On the under surface of the leaves of various *Mentha*, particularly *Mentha aquatica*, in autumn. Duddingston Loch and elsewhere, not uncommon.

The sporidia vary in regard to form, some being obscurely triangular, according to Albertini and Schweiniz, others obtusely quadrangular, according to Persoon. *M. Strauss* has assuredly fallen into an error in supposing *Uredo Menthae* of Persoon to be the young state of *Puccinia Menthae* of the same author.


Scattered irregularly over the whole leaf, in fuscos, very minute spots, giving it a discoloured and almost warty appearance. *Uredo Polygonorum* is very commonly found along with the *Puccinia*, and the latter is then frequently arranged in a circular manner round the former.

13. *P. Centaureae*, on both sides of the leaf, and on the stem, in small, nearly black, scattered tufts, surrounded by the remains of the ruptured epidermis; sporidia oval, the two cells nearly equal; stipes very short. *De Cand*. Fl. Franç. v. 6. p. 59.

HAB. On the leaves and petiols of *Centaurea nigra* and *scabiosa*. About Edinburgh in the autumn, not unfrequent.

Colour almost black, but with a ferruginous tinge at the circumference.

14. *P. Umbelliferarum*, hypophyllous; minute, very dark,

HAB. On the leaves of Myrrhis odorata, Chenopodium sylvestre, and Pimpinella saxifraga, in autumn. Carlowrie, and elsewhere.

Rather rare. Sometimes attacking the petiols. I have never seen it confluent, but frequently scattered in a uniform manner over a whole leaf. On the Continent it has been found on three species of Selinium, two species of Pimpinella, and on Psenclanenum Parisiense.

15. P. Sanicula, hypophyllous; circular, very variable in size, blackish brown, scattered, rarely confluent; sporidia very obtuse, with a subelongated stipes.

HAB. On the lower surface of the leaves of Sanicula europæa, late in the autumn. Auchindenny woods.

This may eventually prove nothing more than a variety of the preceding; yet its aspect is very different. The stipes is longer, the sporidia not so short, and there is a disposition in the smaller, punctiform pustules to form a circle round the larger ones.

16. P. variabilis, on both sides of the leaf, in minute tufts, nearly black, circular, bordered by the remains of the epidermis; sporidia variable, very obtuse, rounded, 2-celled, both often subdivided; stipes very short. Grev. Crypt. Fl. t. 75.

HAB. On Leontodon Taraxacum, rare. About Edinburgh in summer and autumn.

Sometimes one or both cells are subdivided, sometimes neither.

17. P. Heraclei, hypophyllous; blackish brown, irregular in figure, girt by the ferruginous remains of the epidermis; sporidia crowded, obtuse, divided, but scarcely contracted in the middle; stipes very short. Grev. Crypt. Fl. t. 42.

HAB. On the inferior surface of the leaves of Heracleum sphondylium, in summer, not rare. Colinton, and near Kirkaldy.

This species comes the nearest to P. Umbelliferarum of De Candolle, but from his description I am doubtful if it be really that plant. When the present species occurs (as it does not unfrequently) on the petiols, it becomes linear or oblong, and attenuated at each extremity.

18. P. Epilobiæ, hypophyllous; scattered closely over the whole surface, small, round, brown, depressed; sporidia much contracted in the centre, nearly resembling the figure 8, the upper cell the largest. De Cand. Fl. Franç. v. 6. p. 61.


I have never met with this elsewhere. It is remarkable for the form of its sporidia.

19. P. Betonica, hypophyllous; very thickly scattered, and becoming contiguous, but very rarely confluent, minute at first, and ferrugineous after bursting; sporidia short, upper cell obtuse; stipes very short. De Cand. Fl. Franç. v. 6. p. 57.
CRYPTOGAMIA. GASTROMYCI. Puccinia.


Hab. On the inferior surface of the leaves of Betonica officinalis in the autumn. Rare about Edinburgh.

Well marked by its ferruginous colour. The nerve of the leaf is scarcely ever attacked. Margin of the ruptured epidermis somewhat permanent.

20. P. pulverulenta, hypophyllous; dark brown, scattered or subconfluent, often concentric; sporidia crowded, pulverulent, obtusely oval, slightly contracted in the middle, the lower cell terminating in an abrupt and short stipes.

Hab. On the under surface of the leaves of Epilobium montanum and hirsutum, in summer. Slateford. Banks of the Water of Leith by Cannonmills, and elsewhere.

This cannot be confused with that which grows upon Epilobium palustre, were it only on account of the great difference in the form of the sporidia. It is remarkably pulverulent, easily displaced, and altogether has more the habit of a Uredo than a Puccinia.


Hab. On the leaves and petiols of Adoxa moschatellina, in summer. Near Edinburgh, Mr Greene.

A variable plant with regard to the disposition of its pustules; frequently occupying a circular spot, and as often covering the whole leaf in the most irregular manner. On the stem and petiols the pustules are much smaller, scarcely confluent, and often irregularly scattered over its whole length.

22. P. Primula, hypophyllous; deep brown, solitary, scattered, or concentric and subconfluent; sporidia rather slender, with the lower cell attenuated into a short stipes.


Often accompanied by a Uredo, and when both are present the Puccinia is frequently arranged in a circular manner round the Uredo. In one instance, where the epidermis was not ruptured, I found the two plants growing together; the Puccinia at the base fixed by the pedicels, and the Uredo lying above it.


Hab. On the lower side of the leaves of Viola canina, in August. Frequent about Edinburgh.

This must not be confounded with the Uredo, which grows on the same plant, and from which, to the naked eye, it is not dissimilar. The present individual is however less regular in its figure, the pustules before bursting are of an iron grey, and the sporidia darker.

24. P. Valantia, hypophyllous; very minute, scattered, deep brown; sporidia thick, obtuse, variable in shape, with the lower

Hab. On Galium verum and cruciatum. Summer, not unfrequent. When growing on the stem, it is of oblong or linear form.

25. P. glomerata, hypophyllous; tufts circular, depressed, broad, dark fuscous, composed of many smaller ones confluent at the centre; sporidia oblong, with the lower cell somewhat attenuated.

Hab. On the inferior surface of the leaves of Senecio Jacobaea, in spring and summer. Caroline Park, and on the coast of Fife, not rare. Sometimes found on the petiols, always conglomerated but depressed; the small tufts composing the larger ones an iron grey colour before the epidermis is ruptured. The leaf is of a pale colour round the tufts.


Hab. On the inferior surface of the leaves of Spiræa ulmaria, in the autumn, not common. Carlowrie.

A polymorphous plant, particularly in the form of the sporidia. To the naked eye, it has somewhat of the habit of Puccinia Rosae.

27. P. caricina, epiphyllous; brown, eventually black, oval, often confluent, and forming long lines; sporidia oblong, with a white filiform stipes firmly fixed at its base. De Cand. Fl. Franc. v. 6. p. 60.

Hab. On the upper surface of the leaves of the larger Carices in summer and autumn. Duddingston Loch on Carex paludosa.

De Candolle observes, that this plant differs from Uredo caricina (U. oblong-gata of this work), as Puccinia Graminis does from Uredo rubigo-vera. It assuredly can never be confounded with a Uredo; but I am by no means certain of its not being a variety of Puccinia Graminis, modified by the peculiarity of the cellular structure of those plants on which it is parasitic. The sporidia are densely crowded, elongated, sometimes contracted at the dissepiment, the upper cell roundish, and a little thicker than the lower one.


Hab. on the culms and leaves of wheat and many of the larger grasses on Phalaris arundinacea and Arundo Phragmites in autumn. The last is abundant in Duddingston Loch.
Much uncertainty has existed respecting this plant. M. Strauss, and
some other authors, consider it as nothing more than the old state of
Uredo linearis, (U. longissima of Sowerby); an opinion so easily refuted
by microscopical investigation, that I conceive it unnecessary to dwell
upon the subject. It is most injurious to corn, and, in an agricultural
point of view, of some importance; but a remedy against its attacks has
not yet been discovered, and probably never will. *Vid. Sir Jos. Banks

*** Sporidia 1-celled.

29. P. globosa, epiphyllous; minute, scattered, nearly black; sporidia globose, with a filiform, slender stipes. *Grev.* Crypt. Fl. t. 29.

Hab. On the surface of the leaves of the common bean, in summer and
autumn, not common.
At first sight not unlike *Uredo Faba*, which, however, is of a light brown.

161. UREDO. *Pcrs.*

*Very dark, brown, or reddish.* (Nigredo.)

1. U. Geraniin, hypophyllous, scattered, dark fuscous, round, very pulverulent, sometimes confluent; sporidia globose. *Schleich*,

Hab. On the leaves of various species of *Geranium*, as *pratense*, *sylvaticum*, *pyrenaicum*, &c. Coast of Fife; and in the King's Park. Summer.
On the Continent it has been found on several other species. It is a rich coloured plant, particularly when its dark pulverulent spots occur on a leaf, yellow from the first stage of decay. A few sporidia sometimes pos-
se a minute stipes.

2. U. *Ficaria*, aggregated, deep brown, chiefly hypophyllous, confluent; sporidia oval, sometimes with a very minute stipes.

Hab. On the under surface and on the petioles of the leaves of *Ficaria ramosa* *loides*, in summer and autumn. Rosslyn and elsewhere in shady
places.
Very pulverulent, and remarkably confluent. Before bursting, it has, as
*Albertini* and *Schweinitz* observe, a bullated or swollen appearance.

3. U. *suavolens*, hypophyllous, scattered, becoming confluent, reddish or purplish brown; sporidia globose, greenish
*Hook.* Fl. Scot. 2. p. 15.

Hab. On the leaves of *Cnicus arvensis*, in spring and summer, common.
According to Persoon, this plant has an agreeable odour, which, however,
I could never perceive. A variety is found on *Cnicus lanceolatus*, the
chief character of which is, that it is much scattered, and not ultimately
confluent.

4. U. *Polygonorum*, hypophyllous, circular, scattered, rarely
disposed in a circle round a central one, pale brown; sporidia
p. 71.
Uredos. CRYPTO Gamia. GASTROMYCI. 435

Hab. On the under surface of the leaves of Polygonum amphibium, P. convolvulus, and P. aviculare, in summer and autumn. Common.

On P. amphibium and aviculare, this species generally occurs in company with the Puccinia, peculiar to those plants. The sporidia are sometimes furnished with a minute pedicel.

5. U. Primula, hypophyllous, scattered, single, or disposed in a circle round a central one, light brown; sporidia globular or subovoid, and rarely furnished with a minute pedicel. De Cand. Fl. Fran. v. 6. p. 68.


Often found along with Puccinia Primula, but is of a much paler colour.


Hab. On the leaves of a great number of Compositae; particularly Leonotodon taraxacum, Hieracium murorum, H. Lavinii, H. sylvaticum, H. subandum, H. pilosella, Hypochaeris radicata, sometimes on Lapsana communis, in summer and autumn; extremely common.

A common plant, and probably to be found on most of the European Compositae. It frequently happens that the plants are precisely opposite to each other on the two surfaces of the leaf. In some instances, and especially on Leonotodon Taraxacum, the spots are sometimes found in a circular form. I have seen it covering a whole leaf with little circles, each surrounding a single large spot.

7. U. Heraclei, hypophyllous, scattered, sometimes subconfluent, roundish, light brown, girt by the remains of the epidermis; sporidia oviform, sometimes furnished with a very short, blunt pedicel.


Frequently growing along with Puccinia Heraclei; it sometimes attacks the veins of the leaf, and is then oblong. The sporidia are rather transparent, and often granular in the centre.

8. U. bifrons, on both surfaces of the leaf, and opposite to each other, scattered, round, light brown, girt with the remains of the epidermis; sporidia globose. U. Rumicium, var. b. Rumicis acetosa, Decand. Fl. Franç v. 6. p. 66.

Hab. On both surfaces of the leaves of Rumex acetosa and acetocella, in the autumn. Rosslyn woods, and near Newhaven.

This plant, which De Candolle has made a variety of U. Rumicium, in his Supplement to the Flore Francaise, I cannot but consider as distinct. It is not easy to find characters for such minute and obscure plants as the Uredines, but in this instance the whole habit is different. The spots are much larger than in the U. Rumicium, more regularly placed back to back on the two surfaces of the leaf, and the sporidia are pretty regularly globular instead of ovoid. It will be perceived that I have rejected the plant which De Candolle originally called U. bifrons, and which he


Either much scattered or rather crowded, very small or irregular in size, sometimes placed opposite to each other, on the two surfaces of the leaf. They are sometimes surrounded with a brownish coloured ring. Sporidia ovoid, obtuse.


According to De Candolle, this plant is common to a great number of European *Leguminosae*. In this country I have only seen it on the common bean, on *Vicia sepium* and on *Lathyrus arvensis*. I am not quite sure, however, of the *Uredo* on the last being the same-species. *U. Faba* has its surface depressed, with the margin surrounded by the remains of the ruptured epidermis. It is rather large, and generally much scattered, though I have seen it so crowded as to materially affect the colour of the leaf.


HAB. On the leaves of various *Labiateae*, particularly *Mentha arvensis, aquatica, piperata* and *rotundifolia*, in summer and autumn. Duddingston Loch, abundant.

Pustular and prominent before it bursts, and somewhat shining, afterwards flat, and surrounded by the remains of the ruptured epidermis. *Puccinia* and *Uredo Menthae*, supposed by M. Strauss to be different states of the same plant, are distinct even to the naked eye, the former being more compact, and of a much deeper colour. Most of the *Puccinia* are more compact than the *Uredinae*, from their being more or less firmly fixed by their pedicels.

12. **U. intrusa**, hypophyllous, scattered or partially aggregated, reddish-brown, rounded, somewhat prominent, minute, very unequal; sporidia roundish or oval, rarely pedicelled.

HAB. On the inferior surface of the leaves of *Alchemilla vulgaris*, in autumn. Auchindenny woods.

This species grows intermixed with *U. Alchemillae*, from which it differs in every respect, but chiefly in form and colour.

Hab. On the leaves of Luzula maxima and Carex pendula, in summer. Rosslyn woods.

This plant is minute, but may be detected at some distance by the colour of the leaf being changed around each pustule, to a yellow colour in the Carex, and a reddish-crimson in the Luzula. This change of colour frequently happens, especially in the latter plant, when there is no evident Uredo; but probably the result of an imperfect evolution. A similar instance often occurs in Actidium rubellum, the commencement of which frequently produces a crimson spot on the leaves of various species of Rumex, but the parasite is rarely perfected, except in very moist situations.

**Yellow or orange.** (Rubigo.)


Hab. On the lower surface of the leaves of Salix pentandra, in autumn. Rosslyn woods, not common.

The form of the sporidia is too remarkable to be mistaken. Upper surface of the leaf mottled with yellow. Along with the Uredo I have noticed hyaline bodies with globular heads and long pedicels, bearing a near resemblance to a Puccinia.

15. U. Vitellinae, hypophyllous, very minute, convex, orbicular, scattered, becoming confluent; sporidia very minute, globular, transparent. De Cand. Fl. Franç. v. 2. p. 231.


Extremely minute, but prominent, and when examined with a glass, the epidermis found to be often, but slightly ruptured, and remarkably thin and delicate. Soon after the Uredo has appeared, the leaf becomes yellowish, with brown dots on the superior surface.


Hab. On the under side of the leaves of Salix Caprea, and, according to De Candolle, on S. aurita. May to autumn, very common.

The name is very expressive of the appearance of this plant. It sometimes attacks the fertile Catkins.

HAB. On the under surface of the leaves of the common Coltsfoot, (Tussilago Farfara), in summer, very common; (not on T. Petasites, as stated by mistake in Hooker's Fl. Scot).

A very beautiful plant, of a reddish orange colour, nearly constant in its disposition to form a circle. M. Strauss thinks that the plant which grows on T. Petasites is the same. No two plants, however, can be more distinct, as will be perceived by referring to Uredo Petasites. M. Strauss has, I suspect, committed more than one error in constituting his species U. circinalis.


This species never shows any tendency to grow in a circular manner, nor is it of so fine a colour as the preceding, with which Strauss has confounded it. It quickly spreads, and often completely covers the leaf.


HAB. On the leaves of Mercurialis perennis, in summer, rare. Rosslyn woods.

It is difficult to conceive how M. Strauss could have described this plant as a variety of U. Tussilaginis, the circular mode of growth being the only point of resemblance. That author and Albertini, and Schweinitz, are probably right in identifying the present species with that which is found on several Orchideae.


Of a very bright colour, extremely pulverulent, and often accompanied by Puccinia Potentillae.


HAB. On the lower surface of the leaves of various Roses, in summer and autumn, very common.

This species, is very often accompanied by Puccinia Rosea, and is frequent in gardens. The upper surface of the leaf is mottled with yellow. It must not be confounded with U. effusa, which is much larger, of a reddish orange colour, and most common on the veins of the leaf, and on the petiols.

Uredo. Cryptogamia. Gasteromyci. 439

Har. On the under surface of the leaves of *Rubus fruticosus* and *Corylus*; very common in summer and autumn.

Of a rich deep yellow colour, very pulvulrent, often growing along with *Puccinia Rubi*. The sporidia are dark and granular within, and in a favourable light appear obscurely reticulated.


Har. On the nerves and petiols of the leaves of *Spinosa Ulmavia*, and on the leaves, veins, petiols and seed-vessel of various Roses, in summer and autumn; very frequent.

Large, often spreading nearly round a petiol or seed-vessel, and distorting them. Colour very fine and bright.


Har. On the superior surface of the leaves of the Raspberry (*Rubus Ideus*), in spring and summer, rare. Balmuto. Rosslyn woods.

A singular plant, sometimes rather large, and then very few upon the leaf; generally, however, more numerous, and somewhat smaller. The whole plant has frequently the appearance of a general receptacle, on which minute pustules burst in a gyrose or somewhat circular manner.


Har. On the lower surface of the leaves of *Achemilla vulgaris*, in May and June, not uncommon.

This sometimes becomes so confluent, that M. Strauss has observed it to cover every part of the leaf except the large veins. It is of a fine deep orange colour when in perfection, but grows pale in age and in drying.


Har. On *Euphrasia officinalis* and *Bartsia odoratiss*, in summer and autumn. Pentland Hills.

On the Continent this species has been found on several angiospermous plants of the class Didymisia. *De Candolle* mentions having seen a field in which every individual of the natural family *Rhinanthaceae* was attacked with it; but every other escaped.

27. U. *Linii*, on both sides of the leaf and stem, suborbicu-
HAB. On *Linum catharticum*, in summer; common in dry situations.

Before bursting it has a beautiful, distended and shining appearance, when examined with a glass.

28. *U. Saxifragarum*, hypophyllous and on the calyces, rather large, oval, with an indurated disk after the sporidia have escaped; sporidia bright orange, spherical and granular within. *De Cand. Fl. Franç. v. 6* p. 87.

HAB. On various *Saxifraga*. Balmuto; and King's Park, on *S. granulata*. May, June.

The colour of this species is very brilliant. In the Alps and Pyrenees it is common on various species.


HAB. On the inferior surface of the leaves of various species of *Campanula*, in summer. Balmuto. Salisbury Craigis.

Colour bright when in a recent state; soon after drying becoming quite pale. De Candolle observes that it grows on almost all the *Campanulae*.

30. *U. Pyrole*, hypophyllous, punctiform, scattered or collected into small clusters, golden-yellow, scarcely bursting; sporidia ovate or oblong, somewhat transparent and granular within. *U. polymorpha, var. s. Strauss* in Annal Soc. Wetterav. v. 2. p. 87.

HAB. On the under surface of the leaves of *Pyrola minor*, in June and July. Woods near South Queensferry, and at Ravelrig-toll.

A very distinct species, minute and generally aggregated. The surface of the leaf immediately surrounding the clusters is commonly of a brown colour. Many of the pustules never burst.


HAB. On the lower surface of the leaves of *Euphorbia Helioscopiae*, in autumn, not rare. Foxhall, Captain Wauch.

Minute, distant, round; sometimes on the seed-vessel and stem. It is frequently, (perhaps always), accompanied by small black spots, having the aspect of a *Xylooma*, but are probably nothing more than the inspissated juice of the plant.

HAB. On the leaves and culms of corn and various grasses; from spring to autumn, extremely common.

A very common plant, and perfectly distinct from _Puccinia graminis_, which Strauss considers as its mature state. It not unfrequently happens that a _Uredo_ and a _Puccinia_ inhabit the same plant, and even lie under the same portion of epidermis. This sometimes happens in _Puccinia Menthae_.

33. _U. acidiiformis_, hypophyllous and on the petiols, somewhat aggregated, but generally following the course of the veins, bullated, yellow, bursting in the centre, and much resembling an _Æcidium,_

HAB. On the leaves of _Heracleum Sphondylium_, in spring. Balmuto.

One of the most distinct species I am acquainted with, and not a little resembling in habit some varieties of _U. candida_. The pustules are prominent, and, after bursting, the margin remains somewhat erect and entire for a length of time.


Punctiform, sometimes spreading without being confluent, over the whole leaf, and giving it a deep golden-yellow colour.


HAB. On the leaves of _Epilobium palustre_, in spring, rare. Duddingston Loch.

This seems to be very distinct from the preceding, with which Persoon united it.


HAB. On the lower surface of the leaves of _Sonchus oleraceus_ and _arvensis_, in summer, very common.

This species often attacks the stem, and sometimes covers a whole leaf. It does not burst freely or regularly, and scarcely rises above the level of the epidermis. I have seen it nearly of a bright scarlet, and assuming all shapes.

CRYPTOGAMIA. GASTROMYCII. UREDO.

HAB. On the lower surface of the leaves of Tussilago Petasites, in autumn, common.

This plant bears considerable resemblance to the last. It never grows in a circular manner, but frequently spreads irregularly over a whole leaf; and ought not to have been included by Strauss under his U. cirrinalis. In the Flora Scotica, U. Tussilaginis is stated to grow on Tussilago Petasites, which mistake probably originated in myself, as I sent the species to Dr Hooker.


HAB. On the lower surface of the leaves of Populus nigra and balsamifera, in autumn, rather rare. Carlowrie, and near Newhaven.

A very distinct and beautiful species, with remarkably long sporidia. In Hooker’s Flora Scotica, it is said, on my authority, to grow on Populus tremula also, which is erroneous.


HAB. a. On populus tremula, in Rosslyn woods; β. on Betula alba, common. Both in autumn.

De Candolle unites var. β. and Persoon’s U. populina with his U. longicapsula; but M. Strauss has, with great propriety, separated them.

*** Dust white. (Albugo.)


HAB. On plants belonging to the Natural Order Cruciferae, (Class Tetradyndarea, Linn.), attacking the leaves, stems, calyx, and even the seed-vessel; from the commencement of spring to the end of autumn. Extremely common on Thlaspi Bursa-Pastoris, and Erysimum officinale, Cochlearia armoracia, and different species and varieties of Brassica, in gardens.

I believe it to be very doubtful whether there is more than one white Uredo known.

**** Dust black-brown, or violet, attacking the fructification of plants. (Ustilago.)

41. U. Septetum, within the fruit and glumes of corn, and va-

Hab. Within the fructification and glumes of oats, wheat, rye, barley, and many grasses. Summer.

A plant known under the name of Smut Brand or Burnt Corn, and productive of great injury to corn when coming into ear.

42. U. urecolorum, attacking the fructification of carices, and forming a black, compact, slightly pulverulent mass, composed of a pale solid nucleus, surrounded by the naked sporidia, which are small and globular. De Cand. Fl. Franç. v. 6. p. 78. U. Carecis, Pers. Syn. p. 225.

Hab. On the fructification of several species of Carex, as C. precox, stel-lulata and panicea. Summer; not very common.

Not unfrequently a line or two in diameter, and nearly globose.

43. U. carices, always inclosed within the grain, and filling it with a uniform, dense, fetid, blackish-brown mass, composed of very minute spherical sporidia. De Cand. Fl. Franç. v. 6. p. 78. Hook. Fl. Scot. 2. p. 16. U. sitophila, Ditm. in Sturm’s Deutsch. Fl. t. 34. (Fungi.)

Hab. Within the grains of wheat; late in the summer and in the autumn. Corn-fields.

The only external change effected by this minute plant on the grains within which it is parasitic, is that of making them a little rounder; so that a botanical eye is necessary to detect it. On bruising the grain, the powder has an unctuous feel, and a very fetid smell; it is supposed to be a new genus by Ditmar, from the sporules being contained, according to him, in a true peridium.


Sporidia resembling those of U. Segetum, under the microscope, and equally minute.


Sporidia similar to the preceding in form and size, but of a dull colour. De Candolle mentions that the stamens issue uninjured from the infected florets.
162. **Æcidium.**

*Scattered.*


**Hab.** On the leaves and small branches of *Pinus sylvestris* in summer, Drumshoeland Moor, very rare.

The largest of the genus, being sometimes more than 2 lines high, and above 1 line in diameter when growing from the bark; on the leaves it is much smaller.


**Hab.** On the under, and rarely on the upper surface of *Epilobium montanum* and *tetragonum*, not unfrequent. Slateford; Corstorphine Hill; Braid Hermitage, &c. June—August.

Very beautiful; regularly dotted over the whole leaf.

3. **Æ. Violarum**, hypophyllous, and on the petiols; scattered or subaggregated, numerous; peridia whitish, split into many small deciduous teeth; sporidia orange, becoming obscure brown. *De Cand. Fl. Franç.* v. 2. p. 240.

**Hab.** On the lower surface of the leaves, and on the petiols of *Viola canina* and *tricolor*. May and June. Balmuto. Rosslyn and Granston woods.

It is very often closely crowded, but never agglomerated. I have never seen the whole leaf covered.

4. **Æ. albescens**, hypophyllous, and on the petiols, scattered, distinct; peridia very white, split into a few comparatively large teeth; sporidia yellowish-white; surface of the leaf blistered, whitish.

**Hab.** On *Adoxa moschatellina*. April. Arniston woods.

A beautiful species, very remarkable from its general white aspect, partly arising from the surface of the leaf being blistered for some distance round the plant.

5. **Æ. Taraxaci**, hypophyllous, very numerous, subsessile, scattered, or collected into little clusters; peridia white, split into subrevolute teeth; sporidia fine orange.

**Hab.** On the inferior surface of the leaves of *Leontodon Taraxacum*, in June and July. Carlowrie.

A fine species, spreading over the whole leaf, and generally collected into numerous little clusters, with single ones scattered between them. *Sporidia* somewhat ovate.
**Distinctly clustered or irregularly agglomerated.**

6. *Æ. Perichymenia*, hypophyllous; peridia distinct, but decidedly clustered and crowded, prominent, becoming subelongated, the mouth with a few, broad, very delicate deciduous teeth; sporidia fine orange. *De Cand. Fl. Franç. v. 2. p. 597.*

Han. On the under surface of the leaves of *Lonicera Perichymenia*, from June to August. Rosslyn woods, rare.

A species intermediate between the Genera *Rastelia* and *Æcidium*, as defined by Link; the only difference lies in the one having an elongated peridium, the other a short one resembling a calyx. *Æ. Perichymenia* is known at first sight by a large yellow spot on the upper surface of the leaf, which is not unfrequently accompanied by a sphaecellated or brown decayed portion.


Han. On the leaves and petiols of *Bunium Bulbocastanum* and *Pimpinella Saxifraga*. Balmuto. Spring.

According to De Candolle, it is found on several umbelliferous plants, swelling and deforming the leaves and petiols, and not unfrequently depriving the portion of leaf above it of its nourishment. The orifice of the peridium is small, entire, and somewhat depressed.

8. *Æ. Jacobaeæ*, hypophyllous, at first prominent, pustular, soon becoming agglomerated, very numerous; peridia splitting into short, brittle, yellowish-white teeth; sporidia pale orange.

Han. On the lower surface of the leaves of *Senecio Jacobaeæ*, from June to August. Between Petitcur and Burntisland.

The agglomerated clusters large, depressed, numerous; rendering the leaf yellowish on the superior surface.


This plant, which grows in France on *Prenanthes muralis* and *purpurea*, will probably be found to be more general than is imagined, and deserve a more comprehensive specific name. It produces a yellowish-brown spot on the upper surface of the leaf.


On the leaves they are often in small clusters of 3–8 together; on the stem
which is more or less swollen and deformed, they are larger, of an oval form, agglomerated, and partly imbedded in the swollen stem as in a receptacle.


*Hab.* On *Ficaria ranunculoides*. May and June. Rosslyn and Granton woods.

Well marked by its pale colour, and the whitish circle round the clusters, which are seldom more than 2 lines in diameter, but often smaller.

12. *Æ. Grossularia*, hypophyllous, upon a thickened portion of the leaf, which, on the upper surface, is of a fine red colour with a yellow border; peridia densely crowded, splitting into yellowish-white revolute teeth; sporidia pale. *Grev.* *Crypt. Fl.* t. 62. *De Cand.* Fl. Franç. v. 6. p. 92.

*Hab.* On the inferior surface of the leaves of *Ribes Grossularia*, and on the young berries. May—July, common.

This species may be detected at a distance by the bright red spots with yellow margins on the upper surface of the leaves; the fruit is sometimes attacked by it, and rendered deformed, and of the same red colour; but the plant seldom matures itself on the berry.


*Hab.* On the lower surface of the leaves of *Ranunculus lingua* and *acris*, in June and July. Duddingston Loch and in Rosslyn woods.

*De Candolle* has no fewer than eight varieties of this species, of which it is very probable some may prove distinct.

14. *Æ. Caltha*, hypophyllous and on the petiols, aggregated, short, somewhat campanulate, with numerous very minute marginal teeth; sporidia bright orange, subglobose or oval.

*Hab.* On the inferior surface of the leaves of *Caltha palustris*. Spring. Dunearn Hill.

This plant differs so much from the preceding, that I have little hesitation in describing it as a distinct species; the colour is much brighter and darker, and the margin does not possess that pale and brittle character so remarkable in *U. Ranunculacearum*; the form of the peridia also differs.


This plant is rather variable in its appearance but is always cylindrical, and of a fine orange colour; on the upper surface of the leaf it produces a bright crimson spot. It is still a popular belief that Berbery-bushes produce the blight in wheat; accidental circumstances may have tended to confirm this opinion, but the two plants are entirely different.


The part on which this parasite grows is always swollen and deformed, and the plant is partly immersed as if in a receptacle.


Hab. On Sorbus aucuparia, in summer and autumn. Rosslyn and Auchindenny woods, and elsewhere, frequent.

Peridia almost 2 lines in length, very slender. The presence of the plant is marked by an orange or reddish spot on the upper surface of the leaf.

** Growing in circles.


Hab. On the under surface of the leaves of Tussilago Farfara, in July and August, common.

A beautiful species, and not liable to be confounded with any other.


Hab. On the under surface of the leaves of various species of Rumex, in wet places, in May and June, very rare. Duddingston Loch.

A very beautiful little plant, too well marked to need farther description.

20. Æ. Allii, hypophysyllous, marked by a pale spot on the upper surface of the leaf, and a pale ring round the peridia, which are small, not numerous, splitting into small, brittle, yel-

**Hab.** On the under surface of the leaves of *Allium ursinum*, in June and July. Rosslyn woods.

Peridia sometimes rather remote, but always concentrically disposed.

**Div. III. Plants sessile or pedicellate, all minute, more or less globular, (except in Erineum), membranaceous or gelatinous. Sporidia not mixed with filaments; (indistinct in Erineum).**

**163. STILBUM. Tode.**


**Hab.** On decaying stems of herbaceous plants, in autumn; frequent. Extremely minute, and liable to escape observation. It is still not understood, and I regret that it is not the season to procure it for accurate examination; from its affinity to the true *Mucors*, I have placed it in this part of my arrangement.

**164. PILOBOLUS. Tode.**


**Hab.** On horse-dung chiefly, early in the morning, or in very cool, cloudy weather. Very fugacious, and a variable plant in the form of the stem-like receptacle, which is sometimes completely filiform. Mr Purton is right in conceiving *P. roridus* to be a mere variety.

**165. ASCOPHORA. Tode.**


**Hab.** On various putrid substances, as bread, vegetables, fruit, &c. The whole year, common, Mr Parry.

From 1-3 lines in height, white, but changing to grey, very slender; at the base are often some barren procumbent plants, as in *Stachylidium* and *Penicillium*.

**166. MUCOR. Pers., &c.**

**ERINEUM. CRYPTOGRAMIA. GASTROMYCI.** 449

*Hab.* On dung of various animals, in all seasons, but chiefly in the winter after much rain.

Plant watery, erect, often curved, crowded, 1-3 inches in height; changing from white to a dirty yellow. It bears a near resemblance to *Asco-

_**Peridia very minute, forming a velvety spot.**_


*Hab.* On the leaves of *Populus nigra*; in summer. Carlowrie, and elsewhere about Edinburgh.

The only species of a bright yellow colour.


*Hab.* On the under surface of oak-leaves. Spring and summer. Rosslyn woods, rare.

Somewhat more minute than the last, and, like it, gives the leaf a swollen and distorted appearance.

**Peridia larger, forming a depressed tuft, or plane granulated mass.**


*Hab.* On the under surface of the leaves of *Acer pseudo-platanus*; spring to autumn; abundant.

The most common species; making its first appearance on the leaf, only three days after the latter has burst from the bud. Previous to matur-

CRYPTOGAMIA. GASTROMYCI. ERINEUM.

HAB. On the leaves of Pyrus malus and communis. On the common crab-tree, Craigie Hill, Miss Anna Wauch.

One of the rarer species. Colour very rich when mature.


HAB. On the leaves of Betula alba; spring and summer. Ravelrig-toll, among the willows in the moss, and at Bilston Burn.

The part of the leaf on which the tuft is situated is generally somewhat swollen. It may be mistaken at first for E. betulinum of Rebentisch, but the peridia of the latter are very short and variously shaped.


HAB. On the lower surface of the leaves of the common walnut; in summer. Braid Hermitage.

A remarkable species, of a quadrangular form, on account of being confined between the parallel veins of the leaf, which is somewhat thickened. When I published it under the name of subulatum, I had not received the Supplement to the Flore Française, in which De Candolle has described it; his name must of course take precedence.


HAB. On the inferior surface of the leaves of Crateagus oxyacanthus; in summer, not rare. Rosslyn woods; Carlowrie and elsewhere about Edinburgh.

The margin of the leaf is somewhat deformed, swollen, of a paler colour, and has much the appearance of having been the nidus of insects.


HAB. On the under surface of the leaves of Alnus glutinosa; in summer. Rosslyn woods, rare.

Peridia under the microscope very beautiful, divided into 2-4 short, patent, thick branches, clustered with globular sessile beads, or rather lobes, in which sporules are sometimes to be perceived.


Hab. On the upper surface of the leaves of *Betula alba*; summer. Raivelrig-toll moss; Rosslyn woods, and elsewhere.

Of a splendid crimson colour, which becomes rather dingy in age.


Hab. On the leaves of *Betula alba*, very common. Spring and summer.

Peridia remarkably excentric in their form, never elongated, white, at length dark brown, never crimson.

168. **LICEA.** Schrad.?


Hab. Between the bark and wood of decayed trees, particularly those which have lain on the ground for some time. Autumn.

Very like the eggs of an insect. Sporules bright yellow. I suspect Sowerby’s plant to be a distinct species.


Hab. On rotten wood, mosses, &c., rare, Swanston wood; Pentland hills. Autumn.

Very pulpy in its young state: peridia very thin, and so completely contiguous as to form one mass; the summits, however, are distinct, giving the surface of the whole a papilliform appearance. The mass varies from half an inch to two inches in breadth.
DIV. IV. Plants sometimes of an indeterminate form, but generally globose or oval. Sessile or stipitate. Peridium membranaceous or coriaceous. Sporules intermixed with filaments.

SECT. I. Minute or small plants. Peridium delicate in most instances, and generally fugacious.

169. SPUMARIA. Pers.


Very unequaly effused, either thin or thickish, 1-3 inches broad or more, often attached like froth to grasses and leaves. If hastily bruised it seems nothing but a mass of black powder.

170. RETICULARIA. Bull.


HAB. On leaves, mosses, grass, &c. in autumn.

Reducing itself to powder on the slightest touch when mature. Sporules dark blackish brown.


HAB. On tan in hot-beds and stoves, and also in the open air.

Spreading remarkably fast, and often covering a space of a foot or more in diameter.

171. LYCOGOLA. Mich.


Pretty regular in form; under a lens minutely granular. Well marked by its colour.

**Hab.** On rotten wood and branches of trees. Autumn. Foxhall, Captain Wauch.

Remarkably fragile, 1–2 inches broad, somewhat oval, filled with an immense profusion of sporules.


**Hab.** On decayed leaves, stems of grass, &c. in damp woods. Foxhall, Messrs Wauch and Greville. Autumn.

Not more than one line broad, sometimes two or three confluent together, depressed, within very black. Gregarious. Filaments very few.

172. **DIDERMA.** Pers.


**Hab.** On dead beech leaves. Foxhall, Captain Wauch. At Braid Hermitage, autumn. Balmuto.

Not unlike the eggs of some insect. Sporules of a dark colour to the naked eye.

173. **LEOCARPUS.** Link.


A genus very distinct from *Diderma*, having only one peridium, and no columella.

Sometimes surrounding the stems of grasses in a very crowded manner. At first it is quite pulpy, afterwards dry and brittle. Colour a rich chestnut.

174. **PHYSARUM.** Pers.

1. *Ph. sulcatum*, head globose, flattish beneath, grey, inclined; stipes rather long, pale, weak, sulcate; sporules dark brown. Link in Berl. Mag. v. 3. p. 27.


The pale, almost white, and furrowed stipes, which is so weak at the summit as to render the head inclined, is the distinguishing mark of this species.


The unfurrowed stipes chiefly separates this from the preceding; but the head also droops far more.


Hab. On rotten wood. Autumn. Damp woods about Edinburgh, as Slateford, &c.; rare.

Sufficiently distinguished by its black, firm, thin stipes.


Stipes rather weak towards the summit, and never of a pink colour, in which this species strikingly differs from *Ph. psittacinum*.


Hab. On dead beech wood. Autumn. Foxhall, Captain Wauch.

This species comes so near to *Link’s Ph. leucopus*, that I have not ventured to keep it separate; the only difference being the coloured stipes in our plant. It is very minute, and of an uncommonly stiff and dwarf aspect. Filaments very few.

175. TRICHIA. *Pers.*

* Sessile, effused.


Pulpy, and becoming confluent in small lines while young, thus forming irregular interstices. Peridium very thin.

** Ovate.


Leangium. Cryptogamia. Gastromyci. 455

Very much crowded, and, after the sporules and filaments have escaped, resembling minute cups.


Hab. On rotten wood. Swanston wood, autumn.

Liable to vary in colour, but constantly plaited at its union with the stipes. The mass of sporules and filaments is yellow.

176. LEANGIUM. Link.


This species is furnished with a subjacent thickish membrane, very visible to the naked eye, especially when growing on wood. Peridium straw-coloured, splitting into six or seven irregular segments, which become reflexed. Columella very distinct. Sporules brown.

177. ARSCYRIA. Pers.


Hab. On rotten wood, summer and autumn. Swanston wood. Foxhall, Captain Wauch. Balmuto; Slateford, &c. frequent.

Of a pale colour in its young state, and very soft and pulpy. Sometimes three or four peridia are produced on the same stipes, as in Sowerby's figure.


White and soft in its early state. The whole plant remarkably weak, long, and drooping from the very base; hence the name is very characteristic, and having been given by Bulliard should not have been changed by Persoon.


1. St. fasciculata, crowded, cylindrical; stipes black, arising from a shining subjacent membrane; peridia very fugacious, blackish-brown; stipes continued to the summit of the peri-

Pale when very young; when mature perfectly cylindrical, of various lengths, sometimes even 1 inch, including the stipes. Subsequent membrane very thin, shining.

St. papillata, dark brown, globose, stipitate; stipes penetrating through the summit of the peridium. Pers. Syn. Fung. p. 188. Nees, Syst. t. 10. f. 118.

Not so common as the preceding. Well marked by its globular head, and excurrent summit of the stipes. I rather suspect, however, the latter character is not constant.

179. CRATERIUM. Trentepohli.


The habit of this plant is altogether that of a Craterium; but the lid is of so evanescent a nature as to be seldom seen. Mr Gray has followed Ditmar without acknowledgment.

2. C. vulgare, campanulate, chestnut colour; operculum firm, white; stipes orange; sporules blackish. Ditmar in Sturm's Fung. t. 9. Cyathus minutus, Sow. Fung. t. 239. lowest fig.

A very beautiful little plant, distinctly bell-shaped; published under the above name by Ditmar in Sturm's Fungi, which is adopted by Mr Gray in his arrangement of British plants, without acknowledgment; the latter gentleman has also quoted Sowerby's figure as Craterium vulgare instead of Cyathus minutus, and has given as a synonym De Candolle's Trichia capsulifer, which is Sphaerocarpus capsulifer of Bulliard, t. 470. f. 2.

a totally different plant, not even possessing an operculum.

Sect. II. Plants large. Peridium of a thicker substance, between membranaceous and coriaceous, more durable, often warty.


Lyc. Lyc. Lyc. peridium and by root stipes Lyc figure.


Halb Pastures. Summer and autumn after rain.

Half sunk in the ground. Peridium variable, globose, sessile, or with a short attenuated stipes, almost quite smooth or scaly with warts, or soft spinous processes, or sometimes cracked in a tesselated manner. It rarely exceeds 2 inches in breadth, is very white when young, and reddish-brown when old, and not unlike in habit to the last species.


Halb Pastures. Millburn near Edinburgh, in the autumn.

Peridium at first white, afterwards brown, unequally covered with small, soft, rather distinct spines, occasionally, however, only with furfuraceous scales; 1–2, or more, inches in diameter. Stipes 2–3 inches high, 1–1½ thick, warty towards the summit, thickened and plicate at the base.


Halb Woods, about the stumps of old decayed trees, road-sides, &c. Summer and autumn.

Growing in tufts, and often so much crowded as to compress each other. Peridium sometimes distinctly pyriform, but in this country more frequently contracting beneath the head, so as to produce the appearance of a thick stipes. The mouth of the peridium is small, roundish, but irregular, and the whole surface generally covered with minute erect scales. This genus is involved in the greatest obscurity, as far as regards the distinction of species. There are abundant figures extant, but they run so much into each other, and the descriptions are so encumbered with varieties, and doubtful synonyms, that the task of reconciling them is almost hopeless.

181. SCLERODERMA. Pers.

(The little conglutated masses of sporules are distinctly seen, by tearing the plant asunder before it bursts.)

1. S. verrucosum, large, gregarious, subglobose, yellowish-brown, scales small, numerous; stipes subelongated, incrassa-


Hab. Dry fields and pastures. Summer and Autumn. Pentland hills.

Whitish or blueish grey when young, 1-2 inches in diameter, globose, sometimes slightly depressed. Mouth rather small, ragged.


The largest of the genus, and indeed of the whole order, measuring not unfrequently nearly a foot in diameter. Bulliard mentions having seen many of 18, 20, and 23 inches in diameter, and on the authority of others affirms them to attain the enormous bulk of near 9 feet in circumference. The flesh is at first white, afterwards of a greenish-yellow, lastly of a brown-grey. The outer peridium cracks and peels off in large flakes on being handled. Root simple, scarcely thicker than a swan's quill, and very brittle.

182. BOVISTA. Pers.
Cyathus. Cryptogamia. Gastromyci. 459

Div. V. Peridium carnose or coriaceous, cyathiform, or very minute and globular, enclosing lenticular or oval bodies, which contain sporules. (The genus Erysiphe is epiphyllous).

183. CYATHUS. Haller? Pers.


Hab. On the ground, or on sticks in damp woods. Foxhall, Captain Wauch.

The only species with a shaggy surface.


When young the whole plant is somewhat tomentose, and of a deeper ochre-yellow. In old age it becomes whitish, or very pale wood colour.


Hab. On the ground, or on old wood, sticks, straws, &c. Autumn. Fields about Edinburgh.

More rare than the two first species, and easily distinguished by the expanded orifice and leaden grey colour of the inner surface.

184. ERYsipHE*. Rebent.

1. E. Artimesiae, very minute, on both surfaces of the leaf; filaments forming a dense whitish web.

Hab. On Artimesia vulgaris, frequent. Autumn.

Frequently scattered over the whole leaf, but sometimes in distinct spots.

2. E. trifolii, on both sides of the leaf, very globular, nearly black, larger than the preceding; filaments giving the leaf a farinose aspect.

* I am unable to draw up minutely accurate specific characters of several species of this genus, as dried specimens do not recover sufficiently on being moistened, and some were collected before I had this work in view. The name of the plant, however, on which they grow, will be sufficient as a general guide to the student.
CRYPTOGAMIA. GASTROMYCI. Erysiphe.

Hab. On the leaves of Trifolium medium and pratense, in autumn. Foxhall and elsewhere.

Conspicuous from the white, pulverulent appearance it gives to the whole plant.

3. E. Berberidis, on both sides of the leaf, forming circular pulverulent spots, at length confluent; filaments dichotomous at their extremities. De Cand. Fl. Franç. v. 2. p. 275.

Hab. On the common Berberry. Foxhall, in the garden, and in most gardens about Edinburgh in autumn.

Filaments sometimes 2 or 3 times dichotomous.

4. E. Lathyri, red-brown, minute; filaments spreading over the whole leaf, pulverulent.


Sometimes so completely covering a whole plant as to give it a hoary habit. Often occurring with a variety of Uredo Fabæ.

5. E. Betulae, on the under surface, scattered, very visible, blackish; filaments few, simple, not rendering the leaf whitish. De Cand. Fl. Franç. v. 6. p. 107.


Very regularly scattered over the whole leaf; filaments very fine at their extremity.

6. E. Robiniae, on the upper surface, finely pulverulent; receptacles minute, congregated here and there.

Hab. On the leaves of Robinia viscosa. Foxhall garden, Captain Wauch.

Autumn.

Rendering the leaf slightly pulverulent.

7. E. Arcii, on the under surface, thickly covering the whole leaf; filaments simple? granuliferous bodies, pyriform, small.


I have frequently seen it covering the leaves of a whole plant so thickly as to affect the colour. On account of the pubescence of the leaf it is difficult to examine the filaments.

8. E. Aquilegia, on both sides of the leaf, forming a light pulverulent surface; receptacles few, scattered, distinct. De Cand. Fl. Franç. v. 6. p. 105.

Hab. On the common Columbine (Aquilegia vulgaris), in gardens, late in the autumn. Foxhall, Captain Wauch.

Spots sometimes distinct, and beautifully radiate?

9. E. Achemilla, on the under surface, very numerous, minute, filaments few, forming no filamentous or pulverulent appearance to the naked eye.

It is found on rather sickly looking leaves, but requires a botanical eye to detect it.

10. E. Pisi, on both sides of the leaf, so crowded as to darken its colour; filaments very long and slender. De Cand. Fl. Franç. v. 2. p. 274.


This plant I believe to be the well-known blight or mildew of the pea. When mature, I have seen it give a dark coloured appearance to the leaves from its prodigious abundance.


Not very evident, the receptacles being more obvious than the filaments.

12. E. Loniceræ, on both sides of the leaf, very numerous, scattered, minute; filaments presenting to the naked eye a glaucous pulverulent surface. De Cand. Fl. Franç. v. 6. p. 107.

Hab. On the different species of Honeysuckle, in gardens and in woods. Roslyn woods. Autumn.

Filaments short, and terminating in a dichotomous extremity. Much more minute than E. Berberidis, to which it bears some affinity.

13. E. Asperifoliorum, on both sides of the leaf, resembling a mildew, scattered, becoming confluent, pulverulent; receptacles aggregated here and there.


Receptacles rarely produced. Filaments abundant.

14. E. Ranunculi, chiefly on the under surface, partially scattered; filaments long, flexuose; granuliferous cells oval, containing mostly 4 granules.


Not obvious, as the filaments are few.

Div. V. Solid, carnose, or corneous plants, unaccompanied by filaments. Sporules distributed throughout the mass, or not perceptible.

(No plants of the genus Tuber have been discovered in this vicinity. The other genera of this division are Sclerotium and Tubercularia. In the former the substance is uniform, and no sporules have been discovered; in the latter the whole substance seems to be made up of the fructification, except when a short stipes is present, and the surface is sometimes pulverulent.)

185. SCLEROTIUM. Pers.

1. S. subterraneum, gregarious, roundish, but very irregular, tuberculous, orange-yellow within and without, or whitish. Tode,
Meckl. Fung. t. 1. f. 5. De Cand. in Mem. du Mus. v. 2. S. Muscorum, Pers. Syn. Fung. p. 120.

Hab. About the roots and stems of mosses in damp woods and banks; sometimes attached to the trunks of trees beneath the surface of the soil. Near Caroline Park. Spring.

Extremely irregular in form, 1-4 lines thick, rather spongy when quite fresh; shrinking much in drying. When growing on the trunks or roots of trees, it is somewhat larger, and of a paler colour, and whitish within.

2. S. bullatum, roundish or oval, confluent, corneous externally and black, paler within and concave. De Cand. Fl. Franç. v. 6. p. 113., and in Mem. du Mus. v. 2.

Hab. On various species of gourd, and probably on the common Cucumber, if left to putrify. Foxhall, Captain Wauch. Autumn.

More or less rounded, and often running into each other, 1-2 lines in diameter; from the concavity within, appearing to rest on its margin. Black, and sometimes slightly granulated on the surface. De Candolle says the interior is nearly white, but it varies in this respect.

3. S. fructuum, rounded or oblong, sometimes confluent, white, at length brown or black, corneous externally, within somewhat hollow and carnose. Sel. varium, ββ. Alb. and Schw. p. 75. De Cand. in Mem. du Mus. v. 2.


I have little doubt of this being Tremella ustulata of Persoon, as Albertini and Schweinitz suggest. It is certainly a Sclerotium, and distinct from Sel. varium, which, indeed, De Candolle suspected. The specimens I have examined were 1-2 lines broad, corneous on the external surface only; within soft, juicy, and partly hollow, which in drying produces a collapse of the plant, and somewhat of a tremelloid character.


Hab. On dead leaves of trees, but chiefly oak-leaves, in damp woods. Swanston wood and at Balmuto.

Rare; 1-1½ lines in diameter, regular in form; merely attached to the leaf, or partly penetrating it.


Hab. On the dead stems of large herbaceous plants, especially potato-stalks and the larger Umbelliferae. Extremely common in winter and spring.

Generally more or less oblong, 1-2 lines broad, often longitudinally confluent, more or less depressed, very corneous.

6. S. salicinum, depressed, epiphyllous, scattered, or very

Hab. On the leaves of Salix caprea in autumn and winter. Rosslyn woods.

Minute, rarely more than half a line broad, but often covering a great part of the leaf; very depressed, when young appearing like a mere stain.


Hab. On the leaves of Populus tremula, frequent.

Reddish, at length black, sometimes roundish, but generally angular, confined to a part, or spreading over the whole leaf. It is much less than the preceding, and more depressed.


Hab. On the dead stems of Pteris aquilina, often intermixed with Stromatospharia striiformis, which is much larger. Autumn to spring. Very common.

So minute as to be almost punctiform; usually oval.

9. S. nitidum, minute, somewhat scattered or partially aggre

Hab. On the dead and dry stems of Aconitum Napellus, Hemerocallis flava and fulta, &c. in gardens. Winter and spring, common.

Scarcely so minute as the preceding, more regularly orbicular, not so crowded, and of a more intense black. It is not in the least shining.

186. TUBERCULARIA. Tode.

(Some species appear to be furnished with an external coat, others not. This cir-
cumstance renders the situation of the genus in a system embarrassing.)


Hab. On decayed sticks and branches, the whole year. Extremely common.

Variable in the length of the stipes, which indeed is rather a continuation of the part containing the fructification than a distinct stipes. Sometimes it is almost wanting. The summit is somewhat expanded, about 1 line broad. The plant is more or less scattered, and often covers a large branch.


Smaller than the preceding, and far more depressed; surface not rounded, but gently convex or quite plane, soft, becoming confluent, and angular, often irregular from the union of one or more together.

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**XIV. BYSSOIDEÆ. Grev.**

**Div. I. Filaments minute, jointed. Sporules free, lying in the centre, or scattered through the whole mass.**

187. **FUSIDIUM. Link.**


Hab. On dead beech and oak leaves, in autumn. Abercorn woods, Duddingston.

Forming very irregular, effused spots, one to several lines broad. *Filaments* short, branched.


Hab. In the same situations as the last, but more rare. Abercorn Park.

Plant about the same size as the preceding. *Filaments* longer, and less densely interwoven. *Sporules* in both species oblong, straight, and equally acuminate at each extremity.

188. **SPOROTRICHUM. Link.**

* Entirely or partially tufted.

1. *S. macrosporum*, forming a pulverulent hoariness, inter-spersed with very minute tufts; filaments few, branched, straggling; sporules large, obtusely oval.

Hab. On the younger leaves of apple-trees, the hawthorn, peach-trees, &c. Very frequent in spring and the beginning of summer. Very common.

A very destructive parasite in some seasons, and I suspect of general distribution, for I have detected it on a great variety of plants. To gardeners it is well known as a kind of mildew or blight, and is commonly taken for an insect. The leaves of the peach-trees, even when protected by glass, are often attacked by it, nor does the fruit itself always escape, in which case it frequently drops off. The leaves are more or less distorted by it. As its production is probably the result of a peculiar state of the atmosphere, there is little chance of any means being discovered for its prevention.

2. *S. minutum*, tufts roundish, minute, very white, filaments loosely entangled; sporules very numerous, oval. *Grev.* in Wern. Trans. v. 4. t. 68. t. 5. f. 1.
Trichoderma. Cryptogamia. Byssoidae. 465

HAB. On dung. Autumn and winter. Braid Hermitage.

Tufts generally distinct, but sometimes crowded, not more than half a line in diameter: filaments seldom branched; sporidia oval or suboviform, numerous, rather large for so small a plant.


HAB. On dung and on damp wood; corks, &c. in cellars. Not rare in Edinburgh, the whole year.

Tufts from half to two lines in breadth. Filaments remotely jointed, seldom branched.

4. S. aurantiacum, tufts of a reddish-orange colour; filaments very slender, much entangled; sporules globose, extremely minute. Grev. in Wern. Trans. v. 4. p. 70. t. 5. f. 4.

HAB. On dung and in damp cellars, the whole year.

Tufted, of a fine reddish-orange, particularly in age; about a line in diameter, often confluent. Filaments very fine, branched and much entangled. If the filaments had not been said to be few in S. stercorarium of Link, I should have thought mine the same species.

** Filaments forming an expanded web.

5. S. tenuissimum, very white, forming a web; filaments densely interwoven, very fine; sporules globular, scattered, very minute. Grev. in Wern. Trans v. 4. p. 69. t. 5. f. 2.

HAB. On the dead bark of trees. Autumn. Braid Hermitage.

Pure white, and adhering so close to the bark as to render it difficult to determine at first sight whether it belongs to this order or to the Lichens. It is broadly expanded, the filaments excessively minute, and seldom branched. Sporules round, very minute.—Comes near to S. luxurium of Link, but that species has oblong sporules. It may be S. candidum, but does not answer to the whole description.

189. TRICHODERMA. Pers.


HAB. On rotten wood and damp branches of trees. Autumn and winter, frequent.

Tufts at first distinct, but at length sometimes contiguous, not confluent; 1-3 lines broad. The filaments form a sort of lax covering to the sporules, which commence escaping at the apex; on which account Link places it among the Gastroset.

190. TRICHOTHECIUM. Link.


G g
CRYPTOGAMIA. BYSSOIDEÆ. SEPEDONIUM.

Hab. On rotten wood and damp sticks. Autumn, frequent.
Commencing in a small pure white tuft, at length wholly pink, from a profusion of sporules. Tufts 1-3 lines broad, thickish.

191. SEPEDONIUM. *Link.*


Hab. Within putrefying *Fungi,* especially *Boleti,* in autumn, frequent.
Often spreading throughout a whole fungus, which, when infested with it, has a whitish, cottony exterior, and when broken is full of an abundant yellow powdery mass.

DIV. II. Filaments minute, jointed. Sporules attached to the filaments.

192. ISARIA. *Pers.*


Hab. On Trichia clavata, in damp places. Auchindenny woods, early in spring.
So very minute, that it is difficult to examine; the filaments are obscure, but in my specimens the character was sufficiently decided to bear me out in referring it to this genus. It is fixed at its base by a few radiating white fibres.

193. CERATIUM. *Albert.* et *Schw.*


Hab. On dead wood. Rare about Edinburgh. Autumn.
About a line in height, white. The sporules are projected by means of small elastic hairs from the filaments, and have a glistening appearance. On moistening the plant under the microscope, the whole substance seems to melt away, except a very thin, plicate skin; and the sporules intermixed with a quantity of minute bodies, are left free.

194. STACHYLIDIUM. *Link.*


Spreading on rotten wood and sticks in a scattered manner for an inch or more in breadth, very minute, filaments attenuated at the base, the branches whorled, whorls formed of four short and obtuse ramuli.
195. PENICILLIUM. Link.


_Hab._ On semiputrid stalks of herbaceous plants, in autumn. Near Edinburgh on _Arcticium Lappa._

Spreading in broad lines; the barren filaments forming a very delicate lax web; the fertile ones erect, subdistinct, and very white.


_Hab._ On various putrefying substances, as fungi, fruit, &c. Very common, the whole year.

_Tufts_ composed of an entangled mass of minute filaments, nearly a line high, 1-5 lines broad, at length very glaucous.

196. ASPERGILLUS. Mich.


_Hab._ On various putrefying or damp substances, as fruit, the larger fungi, cheese, &c.; the whole year. Communicated by Mr Parry.

Often spreading to a considerable extent, and varying in shade from a light to a very deep glaucous hue. This is the plant so well known by the name of Blue Mould; it is rapid in its growth, and, from the profusion of sporules, spreads most quickly when once established.

2. A. lanecus, in dense tufts, composed of whitish or yellowish, suberect, entangled filaments, with yellowish heads. _Link_ in Berl. Mag. v. 3. p. 16.

_Hab._ On putrid fungi. About Edinburgh in the autumn, rare.

One line in height, spreading over a large surface. Filaments much branched; heads of sporules large for the size of the plant.


_Hab._ On decaying Agaries, &c. Carlowrie; on Agaries which had been dried and again exposed to moisture.

An elegant species, nearly as large as the last, forming broad spots; heads of the filaments large.

HAB. On damp plants in the herbarium.

Of a dark grey colour, very beautiful under the microscope. **Sporules** forming long beaded filaments, a number of which being clustered together, form an elegant and frequently somewhat drooping head.

197. **BOTRYTIS.** Mich.


A very beautiful little plant, 2–3 lines high, and forming rather broad lax tufts, pure white. **Branches** long, few, and gracefully curved, thickly set with very short ramuli, which appear to be little more than pedicels to the clusters of **sporules**. **Sporules** round, numerous and minute.

2. **B. agaricina**, tufted, confluent, white; filaments one line high, branches divaricate; sporules numerous, ovate, large. Link in Berl. Mag. v. 3. p. 15. Pers. Mycol. v. 1. p. 34.

HAB. On decaying fungi, in the autumn; not unfrequent.

This species covers dying agaries with a white woolly coat. The **sporules** are large and extremely numerous. Ditmar's figure is excellent; (in Sturm's Fungi, t. 51).

3. **B. effusa**, pale purplish-grey, spreading; filaments branched towards the summit; branches divaricated, short; sporules large, oval, rather numerous.

HAB. On the under surface of living leaves of the common Spinach, in autumn. Foxhall, Captain Wauch. About Edinburgh, frequent.

Forming effused spots, 2–6 lines broad, and generally rendering the leaf yellowish. **Filaments** very short, rather lax. At first sight resembling some of the minute *Erinea*.


HAB. On Shepherd's-purse, (*Thlaspi Bursa-Pastoris*), parasitic on those parts which are attacked by *Uredo candida*. Spring and summer.

Scarcely a line high, very white, very lax, growing on the stem in preference to the leaves.

198. **ACREMONIUM.** Link.


Very similar in some respects to *A. verticillatum* and *alternatum of Link*, but differs in being of an olive green colour. The other two species are always white.
199. **CLADOSPORIUM. Link.**


_Hab._ On dead stems and leaves of herbaceous plants, common. Summer and autumn.

Very minute, and, according to *Persoon* in his new work *Mycologia Europaea*, containing four varieties, one of which is said to grow upon dried agarics. This I suspect will prove a distinct species.

2. **C. velutinum**, very minute, spreading on old wood in wide velvety patches, greenish-black; filaments simple or branched, jointed, somewhat thickened upwards.

_Hab._ On the deck of an old condemned Greenland Whaler at Leith. Spring.

Patches 1–4 inches in length, very dark, velvety to the eye more than to the touch, on account of the extreme minuteness of the filaments, which, under the microscope, are opaque and yellowish, but distinctly jointed.

**Div. III. Filaments beaded.**

200. **ACROSPORIUM. Nees.**


_Hab._ On the leaves and culms of grasses, particularly *Holcus lanatus*, early in spring and in autumn. Not rare.

A very minute plant, but from being of a white colour, sufficiently visible on the green leaves of many grasses. The little tufts are somewhat depressed.

2. **A. fasciculata**, filaments branched, somewhat fasciculated, erect, in spreading tufts, white at first, at length a fine glaucous colour.

_Hab._ On putrefying oranges.

Commencing at first with minute, distinct, pulverulent white spots, which speedily become confluent and deep glaucous.

**Div. IV. Filaments without joints. Sporules obscure or wanting.**

201. **TORULA. Link.**


Altogether destitute of beauty. It is with difficulty sometimes that a perfect filament can be obtained, on account of its fragility and rigidity.

202. RACCODIUM. Pers.


Hab. Vaults and cellars; upon walls, wine-casks, bottles, &c. Cellars at Leith, Miss Elliot.
Whitish, yellowish, or reddish when young, but soon becoming nearly black; very widely spreading, extremely soft. The irregular granules are probably the fructification.

203. OZONIUM. Link.


Hab. On rotten wood in wet places, particularly under the bark. Autumn, not uncommon. Braid Hermitage, Slateford, &c.
A very singular plant, and one which has been long in finding a resting-place. De Candolle arranged it in the genus Byssus, which he made a receptacle for several analogous plants till they should be better understood. Persoon, in his new work, has adopted Link's genus Ozonium, under which he has brought together several perplexing species, how judiciously may be questioned.

204. HIMANTIA. Pers.


Hab. On dead leaves where they lie in heaps exposed to a slight degree of moisture. Autumn to spring. Very common.
A beautiful byssus-like plant, with a creeping feathery habit, and of a pure white colour. Filaments capillary, often united into bundles, and sometimes anastomosing.
XV. EPIPHYTÆ. Link.

(Part of Anandré Epiphytæ, Link.)

Div. I. Plants naked, and conglomerated on the surface of dead or living leaves.

205. CYLINDROSPORIUM. Grev.

1. C. concentricum.

Grev. Crypt. Fl. t. 29.

Hab. On both surfaces of living cabbage leaves (Brassica oleracea). Frequent about Edinburgh. May and June.

A very extraordinary plant, forming minute speck-like heaps of an oblong shape, but otherwise very irregular, and projecting into little angles and processes. They are disposed in a concentric manner, are pure white, and change in decay to a dirty yellow. Sporules naked, very numerous, cylindrical, truncate at each extremity, pellucid.

Div. II. Plants bursting through the epidermis of vegetables. Not pulverulent.

206. FUSARIUM. Link.


Hab. On dead stems of the common nettle; not rare in the spring. Abundant about Edinburgh.

Very small, more or less convex, always gregarious, and generally so plentiful as to give a pinkish or orange tinge to the stalk.
## INDEX

TO THE

GENERAE.

The first column of figures denotes the number of Species in each Genus; the second refers to the page where the Generic Character is given; the third to the page where the species are described.

<table>
<thead>
<tr>
<th>Species</th>
<th>First Column</th>
<th>Second Column</th>
<th>Third Column</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acer</td>
<td>2. xlii</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>Achillea</td>
<td>2. liv</td>
<td>182</td>
<td></td>
</tr>
<tr>
<td>Acremonium</td>
<td>1. lxx</td>
<td>468</td>
<td></td>
</tr>
<tr>
<td>Acrosporium</td>
<td>2. lxxi</td>
<td>469</td>
<td></td>
</tr>
<tr>
<td>Adenarium</td>
<td>1. xlii</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Adoxa</td>
<td>1. xlii</td>
<td>91</td>
<td></td>
</tr>
<tr>
<td>Ecdidium</td>
<td>20. lxxvii</td>
<td>444</td>
<td></td>
</tr>
<tr>
<td>Ego podium</td>
<td>1. xxxix</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Ethusa</td>
<td>1. xxxix</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Agarcus</td>
<td>85. lxxiv</td>
<td>369</td>
<td></td>
</tr>
<tr>
<td>Agrimonia</td>
<td>1. xli</td>
<td>105</td>
<td></td>
</tr>
<tr>
<td>Agrostemma</td>
<td>1. xli</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>Agrostit</td>
<td>4. xxxiii</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Aira</td>
<td>6. xxxiii</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Ajuga</td>
<td>1. xlvii</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>Alchemilla</td>
<td>2. xxxv</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Alectoria</td>
<td>1. lxxii</td>
<td>348</td>
<td></td>
</tr>
<tr>
<td>Alisma</td>
<td>2. xli</td>
<td>83</td>
<td></td>
</tr>
<tr>
<td>Allium</td>
<td>3. xli</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Alnus</td>
<td>1. lvi</td>
<td>201</td>
<td></td>
</tr>
<tr>
<td>Alopecurusus</td>
<td>2. xxxii</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Amanita</td>
<td>1. lxxiv</td>
<td>369</td>
<td></td>
</tr>
<tr>
<td>Anagallis</td>
<td>2. xxxvi</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Anchusa</td>
<td>1. xxxvi</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Andrea</td>
<td>2. lxi</td>
<td>223</td>
<td></td>
</tr>
<tr>
<td>Anemone</td>
<td>1. xlvi</td>
<td>122</td>
<td></td>
</tr>
<tr>
<td>Angelica</td>
<td>1. xxxviii</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Anietangium</td>
<td>1. lxi</td>
<td>229</td>
<td></td>
</tr>
<tr>
<td>Anomodon</td>
<td>2. lxiii</td>
<td>250</td>
<td></td>
</tr>
<tr>
<td>Anthemis</td>
<td>2. liv</td>
<td>181</td>
<td></td>
</tr>
<tr>
<td>Anthoxanthum</td>
<td>1. xxxii</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Anthricus</td>
<td>1. xl</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Anthyllis</td>
<td>1. li</td>
<td>155</td>
<td></td>
</tr>
<tr>
<td>Antirrhinum</td>
<td>3. lxviii</td>
<td>136</td>
<td></td>
</tr>
<tr>
<td>Apargia</td>
<td>3. li</td>
<td>167</td>
<td></td>
</tr>
<tr>
<td>Apium</td>
<td>2. xxxix</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Aquilegia</td>
<td>1. xlv</td>
<td>121</td>
<td></td>
</tr>
<tr>
<td>Arabis</td>
<td>2. xlix</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>Arctium</td>
<td>1. lii</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>Arenaria</td>
<td>6. xlii</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Arscyria</td>
<td>2. lxviii</td>
<td>455</td>
<td></td>
</tr>
<tr>
<td>Artemisia</td>
<td>4. lii</td>
<td>175</td>
<td></td>
</tr>
<tr>
<td>Arum</td>
<td>1. lii</td>
<td>202</td>
<td></td>
</tr>
<tr>
<td>Arundo</td>
<td>2. xxxii</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Ascobolus</td>
<td>1. lxvi</td>
<td>426</td>
<td></td>
</tr>
<tr>
<td>Asco phora</td>
<td>1. lxvii</td>
<td>448</td>
<td></td>
</tr>
<tr>
<td>Asparagus</td>
<td>1. xli</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>Asperocaulon</td>
<td>2. lxvii</td>
<td>307</td>
<td></td>
</tr>
<tr>
<td>Aspergilus</td>
<td>4. lxx</td>
<td>467</td>
<td></td>
</tr>
<tr>
<td>Asperugo</td>
<td>1. xxxvi</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Asperula</td>
<td>1. xxxiv</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Aspidium</td>
<td>7. lx</td>
<td>221</td>
<td></td>
</tr>
<tr>
<td>Asplenium</td>
<td>5. lx</td>
<td>219</td>
<td></td>
</tr>
<tr>
<td>Aster</td>
<td>1. liv</td>
<td>179</td>
<td></td>
</tr>
<tr>
<td>Asteroma</td>
<td>2. lxxiv</td>
<td>368</td>
<td></td>
</tr>
<tr>
<td>Astragalus</td>
<td>3. lii</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>Atriplex</td>
<td>5. lxxi</td>
<td>211</td>
<td></td>
</tr>
<tr>
<td>Atropa</td>
<td>1. xxxvi</td>
<td>53</td>
<td></td>
</tr>
<tr>
<td>Avena</td>
<td>4. xxxiv</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Common Name</td>
<td>Page</td>
<td>Index Page</td>
<td></td>
</tr>
<tr>
<td>---------------------</td>
<td>--------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Ballota</td>
<td>1.</td>
<td>xlvii 132</td>
<td></td>
</tr>
<tr>
<td>Bangia</td>
<td>3.</td>
<td>lxvi 301</td>
<td></td>
</tr>
<tr>
<td>Barbarca</td>
<td>2.</td>
<td>xlix 143</td>
<td></td>
</tr>
<tr>
<td>Bartramia</td>
<td>3.</td>
<td>liii 252</td>
<td></td>
</tr>
<tr>
<td>Bartsia</td>
<td>1.</td>
<td>lxviii 134</td>
<td></td>
</tr>
<tr>
<td>Bellis</td>
<td>1.</td>
<td>liv 180</td>
<td></td>
</tr>
<tr>
<td>Berberis</td>
<td>1.</td>
<td>xli 82</td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>1.</td>
<td>xxvii 59</td>
<td></td>
</tr>
<tr>
<td>Betonica</td>
<td>1.</td>
<td>lxvii 131</td>
<td></td>
</tr>
<tr>
<td>Betula</td>
<td>1.</td>
<td>liv 203</td>
<td></td>
</tr>
<tr>
<td>Bidens</td>
<td>1.</td>
<td>liii 174</td>
<td></td>
</tr>
<tr>
<td>Blechnum</td>
<td>1.</td>
<td>lx 217</td>
<td></td>
</tr>
<tr>
<td>Bocomyces</td>
<td>2.</td>
<td>lxx 346</td>
<td></td>
</tr>
<tr>
<td>Boletus</td>
<td>7.</td>
<td>lxxv 403</td>
<td></td>
</tr>
<tr>
<td>Borado</td>
<td>1.</td>
<td>lxxv 46</td>
<td></td>
</tr>
<tr>
<td>Borrera</td>
<td>3.</td>
<td>lxxi 339</td>
<td></td>
</tr>
<tr>
<td>Botrychium</td>
<td>1.</td>
<td>lx 217</td>
<td></td>
</tr>
<tr>
<td>Botrytis</td>
<td>4.</td>
<td>lxxx 468</td>
<td></td>
</tr>
<tr>
<td>Bovista</td>
<td>2.</td>
<td>lxxix 458</td>
<td></td>
</tr>
<tr>
<td>Brassica</td>
<td>4.</td>
<td>l 146</td>
<td></td>
</tr>
<tr>
<td>Briza</td>
<td>1.</td>
<td>xxxii 24</td>
<td></td>
</tr>
<tr>
<td>Bromus</td>
<td>10.</td>
<td>xxxiv 27</td>
<td></td>
</tr>
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<td>Index</td>
<td>Page</td>
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<td>213</td>
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<td>247</td>
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<td>184</td>
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<td>226</td>
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<td>185</td>
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<td>Juncus</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jungermannia</td>
<td>270</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juniperus</td>
<td>211</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactuca</td>
<td>166</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laminaria</td>
<td>282</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lamium</td>
<td>130</td>
<td></td>
<td></td>
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<tr>
<td>Lapsana</td>
<td>170</td>
<td></td>
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</tr>
<tr>
<td>Lathrea</td>
<td>135</td>
<td></td>
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</tr>
<tr>
<td>Lathyrus</td>
<td>156</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lavateria</td>
<td>153</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leangium</td>
<td>455</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecanora</td>
<td>331</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecidea</td>
<td>324</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemna</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leocarpus</td>
<td>453</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leonodon</td>
<td>166</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leonurus</td>
<td>133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leotia</td>
<td>416</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lepidium</td>
<td>140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lepraria</td>
<td>351</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Licea</td>
<td>451</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lichina</td>
<td>286</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ligusticum</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ligustrum</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linckia</td>
<td>322</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linum</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Listera</td>
<td>186</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Littorella</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lithospermum</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lolium</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lonicera</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Page</td>
<td>Index</td>
<td></td>
<td></td>
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<tr>
<td>------</td>
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<td></td>
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<tr>
<td>3.</td>
<td>Malva, li 152</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Marchantia, lxiii 279</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Marrubium, xlvi 133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Matricaria, liv 181</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Medicago, lii 163</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Melampyrum, xlvi 135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Melica, liii 20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Mentha, lxvi 128</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Menyanthes, xxxvi 48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Mercurialis, lxvi 210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Merisna, lxxvi 411</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Merulius, lxxiv 397</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Millium, xxxii 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Montia, xxxiv 33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Morchella, lxxvi 417</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Myosotis, lxxvi 43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Myriophyllum, lii 202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Myrhris, xxxix 67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Mucor, lxxvii 448</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Næmaspora, lxxvii 365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Narcissus, xili 75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Nardus, xxxii 13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Narthecium, xli 77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Nasturtium, lxii 144</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Neckera, lxii 251</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Nodularia, lxvi 300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Nostoc, lxix 322</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Nuphar, xili 120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Nymphæa, xii 6b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Odonthalia, lxv 296</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Cænandria, xxxiii 62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Ononis, li 155</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Onopordum, lii 174</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Opegrapha, lxii 352</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Ophioglossum, lx 217</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Orchis, lv 183</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Originum, lxii 133</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Orinthopus, lii 158</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Orthogalum, xli 76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Orobanche, xlvi 138</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Orobus, li 156</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Orthotrichum, lxii 247</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Oscillatoria, lxvi 303</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Oxalis, xli 101</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Ozonium, lxxxi 470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Palmella, lxix 323</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Papaver, xli 119</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Parietaria, xxxv 39</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Paris, xii 91</td>
<td></td>
<td></td>
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<tr>
<td>16.</td>
<td>Parmelia, lxx 335</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Parmassia, xl 73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Pedicularis, xlvi 136</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Peltidea, lxxi 341</td>
<td></td>
<td></td>
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<td>2.</td>
<td>Penicillum, lxxx 467</td>
<td></td>
<td></td>
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<td>1.</td>
<td>Peplis, xii 82</td>
<td></td>
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<tr>
<td>35.</td>
<td>Peziza, lxxvi 418</td>
<td></td>
<td></td>
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<td>2.</td>
<td>Phacidium, lxxiv 366</td>
<td></td>
<td></td>
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<td>2.</td>
<td>Phacoria, lxxvi 415</td>
<td></td>
<td></td>
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<td>2.</td>
<td>Phallaris, xxxii 14</td>
<td></td>
<td></td>
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<tr>
<td>1.</td>
<td>Phallus, lxxvi 418</td>
<td></td>
<td></td>
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<tr>
<td>7.</td>
<td>Phæcum, lxi 225</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Phellandrium, xxxix 66</td>
<td></td>
<td></td>
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<td>2.</td>
<td>Phleum, xxxii 15</td>
<td></td>
<td></td>
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<td>5.</td>
<td>Physarium, lxxviii 453</td>
<td></td>
<td></td>
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<tr>
<td>1.</td>
<td>Pilobolus, lxxvii 448</td>
<td></td>
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<td>1.</td>
<td>Pilularia, lix 215</td>
<td></td>
<td></td>
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<td>1.</td>
<td>Pimpinella, xxxix 69</td>
<td></td>
<td></td>
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<td>1.</td>
<td>Pinguicula, xxxi 5</td>
<td></td>
<td></td>
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<tr>
<td>1.</td>
<td>Pinus, lxvi 204</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Plantago, xxxiv 37</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Poa, xxxii 21</td>
<td></td>
<td></td>
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<tr>
<td>1.</td>
<td>Polymenium, xxxvi 50</td>
<td></td>
<td></td>
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<tr>
<td>1.</td>
<td>Polygala, li 154</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Polygnomon, xili 89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Polypodium, lx 222</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>Polyphora, lxxv 398</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Polysiphonia, lxvi 308</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Polystigma, lxxvi 365</td>
<td></td>
<td></td>
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<tr>
<td>7.</td>
<td>Polytrichum, lxii 245</td>
<td></td>
<td></td>
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<td>3.</td>
<td>Populus, lxvi 210</td>
<td></td>
<td></td>
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<tr>
<td>1.</td>
<td>Porina, xxxii 354</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Potamogeton, xxxv 40</td>
<td></td>
<td></td>
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<tr>
<td>7.</td>
<td>Potentilla, xlv 116</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Primula, xxxvi 47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Prunella, xliii 134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Prunus, xlv 107</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
<td>Pteris, lx 218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Pterogonium, lxii 236</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Ptilolía, lxvi 297</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29.</td>
<td>Puccinial, lxxvii 428</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Pulmonaria, xxxv 45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Pyrethrum, liv 180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Pyrola, xliii 192</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Pyrus, xiv 9</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
<td>Quercus, lvii 202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Raccodium, lxxxi 470</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Ramalina, xlii 348</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Ranunculus, xlii 123</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Raphanus, l 148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Reseda, lxxiv 105</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Reticularia, lxxviii 452</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Rithinanthus, xliii 135</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Rhizomorpha, lxxiii 354</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Ribles, xxxvii 56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INDEX.

Riccia, - 1. lxiii 280
Rosa,  - 6. xlv 111
Rotbollia,  - 1. xxxvi 33
Rubus,  - 6. xlv 114
Runex,  - 7. xlii 82
Ruppia,  - 1. xxxv 42
Sagina,  - 2. xxxv 42
Salicornia,  - 1. xxxi 1
Salix,  - 15. lvii 204
Salsola,  - 1. xxxv 59
Salvia,  - 1. xxxi 6
Sambucus,  - 2. xl 72
Saponaria,  - 1. xxxvii 55
Scirpus,  - 1. lxvii 95
Scrophularia,  - 4. xlvii 93
Scabiosa,  - 2. xxxv 34
Scandix,  - 1. xl 72
Schoenus,  - 3. xxxii 9
Scirpus,  - 9. xxxii 10
Scleranthus,  - 1. lxi 94
Sclerotium, 9. lxxix 461
Sclerodema,  - 2. lxxix 457
Sclopendrium,  - 1. lx 218
Scrophularia,  - 3. xlvii 137
Scutellaria,  - 1. xlvii 134
Scytothephum,  - 1. lxvii 288
Scytonema,  - 3. lxvi 302
Sedum,  - 5. xlii 100
Schoenolphum,  - 1. xlvi 107
Senecio,  - 5. liv 178
Sedum,  - 1. lxxx 466
Sarma,  - 1. xxxvi 34
Silene,  - 2. xlii 96
Sinapis,  - 2. l 147
Sisamum,  - 1. xxxvii 62
Sistotrema,  - 1. lxxv 405
Sisymbrium,  - 2. l 145
Sium,  - 4. xxxix 64
Smyrnium,  - 1. xxxix 70
Solana,  - 1. xxxvi 64
Solidago,  - 1. liv 179
Sonchus,  - 3. lii 165
Sparganum,  - 3. livi 189
Spergula,  - 2. xliiv 104
Sphacellaria, 5. lxvii 313
Sphagnun,  - 4. lxi 223
Sphaer,  - 12. lxxii 363
Sphaerococcus,  - 7. lxv 294
Sphaerophorun,  - 3. lxxi 347
Spiraea,  - 3. xlv 110
Sphalum,  - 1. lxix 324
Sphalumneum,  - 1. lxi 231
Spongioscarpus,  - 1. lxv 286
Sporocynus,  - 3. lxv 287
Sporotrichum,  - 5. lxxx 464
Spumaria,  - 1. lxxviii 459
Stachys,  - 4. xlvii 132
Stachylium,  - 1. lxxx 466
Staicy,  - 1. xl 73
Stellaria,  - 6. xliii 97
Stemones,  - 2. lxxvii 455
Stereocaulon,  - 1. lxxi 347
Sictia,  - 3. lxxi 340
Stilbospora,  - 2. lxxiv 366
Stilbum,  - 1. lxxvi 448
Stratiotes,  - 1. xlvii 122
Stromatophrum,  - 19. lxxiii 355
Subularia,  - 1. xlii 141
Symphytum,  - 2. xxxvi 45

Tetraphis,  - 2. lxxi 230
Teucrium,  - 1. xlvii 128
Thalictrum,  - 2. xlvii 123
Thelephora,  - 19. lxxv 406
Thelotrema,  - 1. lxx iii 330
Thessallium,  - 1. xxxvii 63
Thlaspi,  - 2. xliii 139
Thymus,  - 1. xlvii 134
Tilia,  - 1. xlii 121
Toriis,  - 2. xl 70
Tortula,  - 8. xlii 231
Torus,  - 1. lxxvi 469
Tragopogon,  - 1. lii 165
Tremella,  - 7. lxxvii 426
Trichia,  - 3. lxxvii 455
Trichoderma,  - 1. lxxx 465
Trichostomun,  - 6. xli 242
Tricotheicum,  - 1. lxxx 465
Trifolium,  - 11. lii 159
Triglochin,  - 2. xlii 84
Triticum,  - 4. xxxiv 31
Trollius,  - 1. xlvii 127
Tubercularia,  - 2. lxxix 462
Tussilago,  - 2. liv 177
Typha,  - 1. lvi 188

Ulex,  - 2. li 155
Ulmus,  - 2. xxxviii 59
Ulva,  - 7. lxxi 299
Ureolarias,  - 2. lxxx 330
Uredo,  - 45. lxxvii 434
Urtica,  - 2. liv 201
Usnea,  - 2. xlii 349
Utricularia,  - 2. xxxii 5

Vaccinium,  - 3. xlii 87
Vaginalia,  - 1. lxxii 305
Valeriana,  - 4. xxxii 7
Varioilum,  - 3. lxx 330
Vaucheria,  - 6. lxxi 305
Verbascum,  - 1. xxxvi 53
Verbena,  - 1. xlvii 138
Veronica,  - 10. xxxi 3
Verrucaria,  - 1. lxxvi 353
Viburnum,  - 4. xli 72
Vicia,  - 6. li 157
<table>
<thead>
<tr>
<th>Plant</th>
<th>Page</th>
<th>Index</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vinca</td>
<td>2. xxxvi</td>
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Genera, 321. Species 1794.
Phenogamous Plants, 771.—Cryptogamous, 1023.
Acotyledons, 1023.—Monocotyledons, 182.—Dicotyledons, 589.

FINIS.