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 Cryptogamia, and illustrative plates / By Robert Kaye Greville.

Contributors

Greville, Robert Kaye, 1794-1866.

Publication/Creation

Edinburgh : Printed for W. Blackwood ; [etc., etc.], 1824.

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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 CRYPTOGAMIA,

AND ILLUSTRATIVE PLATES.

BY

ROBERT KAYE GREVILLE, F.R.S. & F.A.S.E.

MEMBER OF THE WERNERIAN NATURAL HISTORY SOCIETY OF EDINBURGH; OF THE IMPERIAL ACADEMY NATURÆ CURIOSORUM; OF THE NATURAL HISTORY SOCIETY OF LEIPZIG; CORRESPONDING MEMBER OF THE NATURAL HISTORY SOCIETY OF PARIS; HONORARY MEMBER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY, OF THE LIVERPOOL BOTANICAL INSTITUTION, AND OF THE LYCEUM OF NATURAL HISTORY AT NEW YORK, *&c.*

EDINBURGH:

PRINTED FOR WILLIAM BLACKWOOD, EDINBURGH;

AND T. CADELL, STRAND, LONDON.

MDCCCXXIV.

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Omnes species originem familiæ suæ 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.*

P. NEILL, Printer.

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 description of them when acquired. This *desideratum* I have, during the last three years, been endeavouring to supply, and the result is now submitted to the public.

In regard to the authenticity of the species and stations 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 exceptions, 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 communicated 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 Cryptogamic vegetables had been detected, or even sought for; and among the *Hypoxyla*, *Fungi*, *Gastromyci*, *Byssoideæ*, and *Epiphytæ*, scarcely half a dozen species were on record. In order, therefore, to produce a respectable *Flora Edinensis*, I was obliged to be constantly 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 Algæ, 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 Algæ. 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.

Linnæus 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. Polyandria, many stamens arising from the receptacle.
XIV. Didynamia, 4 stamens, 2 being longer than the rest. (Never more than 1 pistil.)
XV. Tetradynamia, 6 stamens, 4 being longer than the rest. (Cruciform 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. Gynandria, stamens arising from the germen or style, as in the *Orchideæ*.
XXI. Monœcia, 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. Polygamia, stamens and pistils in the same flower, or stamens only or pistils only; the whole on one plant or on different plants.
XXIV. Cryptogamia, 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. *Gymnospermia*; the seeds naked, and usually 4, never more. 2. *Angiospermia*; 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. *Polygamia æqualis*; all the florets perfect, having stamens and a pistil.
2. *Polygamia superflua*; florets of the disk perfect, those of the circumference with a pistil only.
3. *Polygamia frustranea*; florets of the disk perfect, those of the circumference with an abortive pistil, or none at all.
4. *Polygamia necessaria*; florets of the disk with stamens, those of the circumference with a pistil.
5. *Polygamia 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. *Monœcia*; two or all the flowers characteristic of the Class found on the same plant.
2. *Diœcia*; two or all the flowers divided, and found on two separate plants.
3. *Triœcia*; the three flowers on three separate plants.

The Linnean Orders of the 24th Class are,

1. *Filices*. 2. *Musci*. 3. *Algæ*. 4. *Fungi*. Two others have been added by modern Botanists, viz. *Hepaticæ* 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 *Lycopodineæ*, the *Marsiliaceæ?* and the *Equisetaccæ?* 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, *(Sporulæ) Sporæ*, *Gongylæ*, &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 *Rachis*. 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 dorsiferæ*).

The groupes 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 *Involucre* or an *Indusium*, (Pl. I. f. 11, 12, 13). This is either

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

Peltate (*peltatum*), when more or less circular, and supported on a small central pillar.

Urceolate, (*urceolatum*), when resembling a cylindrical cup.

Scale-like (*squamiforme*), 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 (*thecæ* 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 *Annulatæ* or *Exannulatæ*.

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 corpuscules (*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 *Litorella 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 Linnæus 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 germens, (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 *vage 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 *Perichætial leaves*, (Pl. I. f. 25. *a*).

The leaves differ extremely in form, and frequent observation alone will enable the student to perceive their gradation, and understand the compound terms frequently used to designate them.

In direction they are imbricated, patent, squarrose, (the apex somewhat curved downwards, or the leaves pointing both upwards 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, recurved or incurved, and may be entire, ciliate, serrate, or (towards 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 percurrente*), 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 *bifarious*, *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 transversely into two portions: the upper and larger portion protects 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 clefts, 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 *Andræa*, *Phascum*, (Pl. I.

f. 16. and *Voitia*) terminates in a deciduous lid (*Operculum*, (Pl. I. f. 17. *a*. and f. 23. *a*). This is of various forms, obtuse, mammillose, 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 membranaceous teeth (Pl. I. f. 21. *b*), which have sometimes slender processes (*Ciliæ*) 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. 1. 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 *Perigonial leaves;* those which surround the calyx, *Perichætial 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 *Jungermanniæ*, which is destitute of an *Operculum*, divides, when mature, into 4 longitudinal valves, (Pl. 1. 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, (*Calyptra*, 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 calyptra, which remains at the base, and issues from the calyx, which usually encloses the calyptra. 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. *Monoclea*, (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 sporules 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 (*Thecæ*) 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 (*Gemmæ*), 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. *Sphærocarpus*, 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 (*Thecæ*) 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 *Theca*, (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 Algæ 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*j*.

The substance of the Algæ 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. CHÆTOPHOROIDEÆ. *Chetophoroids.*

Few genera are found in this Order, which is proposed, in this work, to include certain plants differing very materially from the *Algæ*. 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, (*Receptaculum universale*). The partial receptacle (*Receptaculum partiale*) is the *Apothecium*, or the part which immediately incloses the fructification and sporules (*Gongylæ*, *Sporulæ*, &c.), and, according to circumstances, is known by the common name of *Scutella*, *Shield* (Pl. III. f. 8. *a*, f. 9. *a*), or *Tubercle* (Pl. III. f. 4. *a*, f. 18. *a*). The regular and uniform shields or tubercles are the

Apothecia vera, or, simply speaking, *Apothecia*. Other appearances, such as *Pulvinuli*, *Soredia*, &c. are named Secondary Apothecia (*Apothecia accessoria*). There is little doubt that the latter are capable of reproduction.

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

The *Podetia* are often cup-bearing, or scyphiferous (dilated upwards into a cup, *Scypha*, Pl. III. f. 12. *b*.)

Cyphellæ are pale tubercle-like spots, on the under surface of the thallus; as in *Sticta*, (Pl. III. f. 10. *a*.)

Lacunæ are small hollows or pits on the upper surface of the thallus, (Pl. III. f. 10.)

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

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

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

Lamina proligera, a distinct body containing the sporules, separating from the apothecia, often very convex and variable in form, and mostly dissolving into a gelatinous mass, (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 *Fibrillæ*. They are very striking in the genus *Borrera*.

XI. HYPOXYLA.

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

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 *Endocarpon*, and at the other into the *Fungi*, through the carnose species of *Xylaria*, which in habit resemble the *Clavariæ* 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 suberose 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 (*Sphærulæ*), 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 *Sphærulæ astomæ* 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 *Thecæ* 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 oblong or linear, it is also not improperly called a *Perithecium*. Their sporules are contained in slender hyaline tubes or *theca*, (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 (*sporidia?*) are naked, and intermixed with a black, minute substance, which may be considered in the light of a receptacle. In Link's arrangement it is placed among the *Epiphytæ*.

XII. FUNGI. *Funguses.*

An order of plants agreeing in fructification, though differing much in habit. Their structure is floccose (minutely filamentous); in substance they are mostly carnose, though some are coriaceous, suberose, or almost woody; in colour extremely 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 fructification, 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 order, (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 characteristic 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 surface with thin radiating expansions, constituting the *Hymenium*: these expansions are termed Gills (*Lamellæ*, Pl. IV. f. 24. *a*), and are generally arranged in some determinate order, depending on their relative lengths.

The lamellæ 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 decurrent.

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. 23.), 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 *Rugæ* 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 cellulose surface, the cells being filled with dark green slime abounding with naked sporules. Link has arranged it with the *Gastromyci*, and considers the volva as a *Sporangium*, and the stipes as a *Columella.* This situation seems to be equally erroneous.

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 *Œcidium* (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 *Œcidium* (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. EPIPHYTÆ.

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 *Æcidium*.



F.F. Greville Esq.r del.t W.H. Lizars sculp.t

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 germens, with the elastic filaments.

4. A portion of a plant of *Pilularia 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 Tunbrigiense*, nat. size.—11. One of the 2-valved involucres vertically divided, shewing the capsules attached to a cylindrical receptacle.

12. One of the pinulæ 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 perichætial 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 thecæ.—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.

32. A plant of *Jungermannia epiphylla*, nat. size. *a*, Calyx; *b*, Calyptra; *c*, Peduncle; *d*, Theca; *e*, Theca mature and burst.—33. Spiral filaments and sporules.—34. Plant of a foliaceous Jungermannia, *J. bidentata*, nat size.

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 *Ptilota plumosa*, shewing the fructification naked at the base of an involucre.

14. Summit of a frond of *Gigartina subfusca*, 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 a *Gloionema*.

18. Do. of that of *Bangia Laminariæ*.

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

20. Do. of *Polysiphonia Brodiæi* with fructification.

21. Do. of *Ceramium diaphanum*, with fructification.

22. Do. of *Callithamnion 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 quininum*; two of the filaments united.

28. Filament of *Conferva rivularis*.

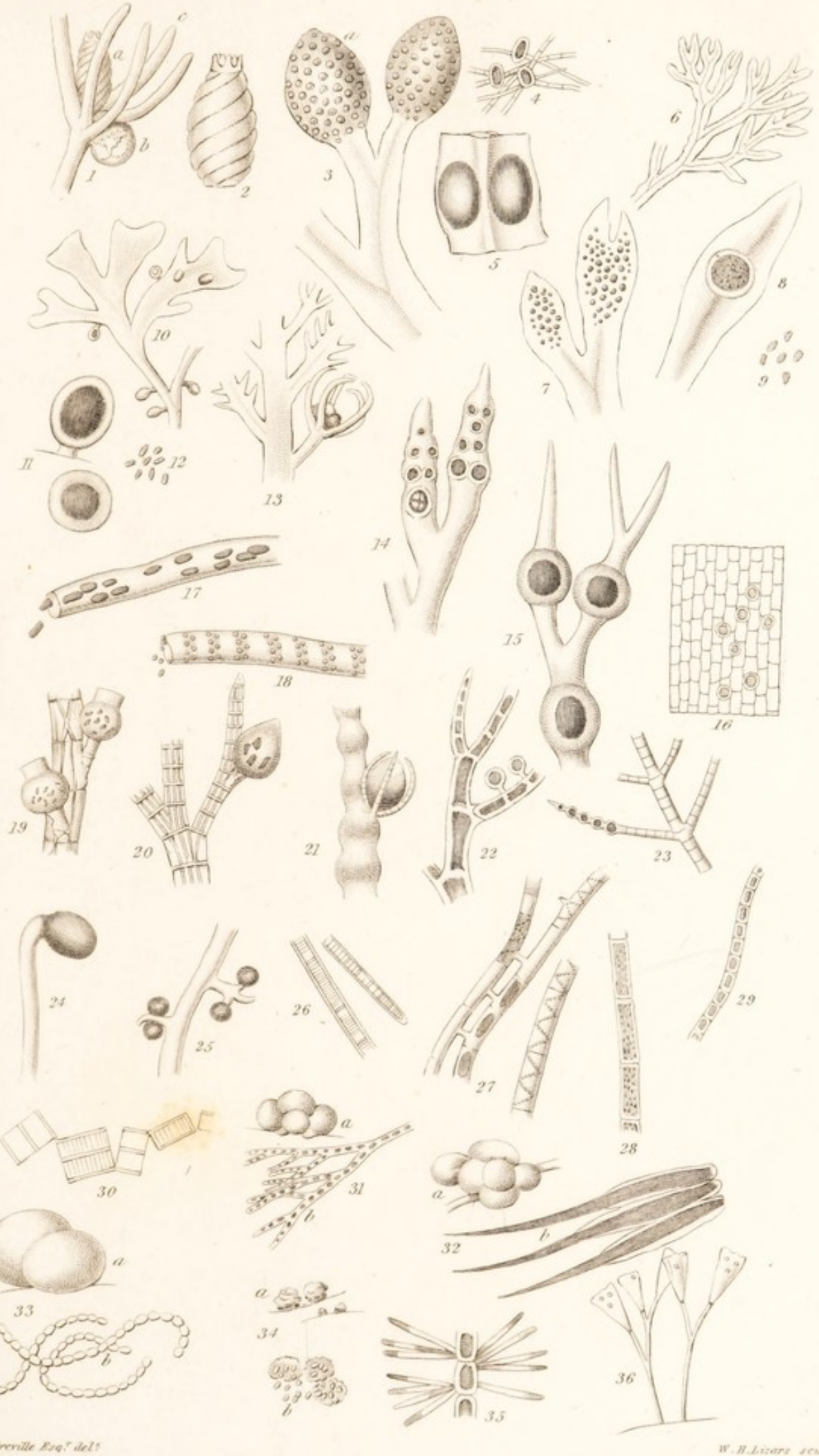
29. Do. of *Conferva ericetorum*.

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

31. Plant of *Chætophora 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.

33. *Nostoc pruniforme*, *a*, nat. size, small. *b*, The moniliform filaments it contains.



R. K. Greville Esq.r del.t

W. B. Lizars sculp.





Fig. 34. *Palmella rosea*, *a*, nat. size. *b*, The sporules.

35. *Echinella fasciculata*, } described by some botanists as vegetables, but
36. *Echinella paradoxa*, } I believe them to have an animal structure.

PLATE III.

Fig. 1 *Lecidea parasema*, nat. size. *a*, The shields or *apothecia*.

2. *Calicium claviculare*, nat. size. *a*, A plant magnified.

3. *Opegrapha scripta*, nat. size. *a*, Portion of a perithecium removed and divided.

4. A plant of *Endocarpon miniatum*, nat. size. *a*, Shews the imbedded tubercles.

5. Portion of the thallus of *Porina pertusa*, nat. size. *a*, Exhibits a section of the thallus, and an inclosed spherule.

6. Segment of the thallus of *Variolaria amara*, nat. size. *a*, A section of the apothecium and thallus.

7. Young and mature apothecia of *Lecanora Perellus*, with a small portion of the crust-like thallus.

8. *Lecanora subfusca*, nat. size. A portion magnified and divided.

9. Part of the foliaceous thallus of *Parmelia herbacea*, nat. size. *a*, A shield or apothecium divided.

10. Part of the frondose thallus of *Sticta pulmonaria*, nat. size. *a a*, The cyphellæ. *b*, A shield divided.

11. Portion of the thallus of *Peltidea canina*, nat. size.

12. *Cenomyce coccifera*, nat. size. *a*, The podetium ; *b*, The cup or scypha ; *c*, The fructification, (*Lamina proligera* of Acharius).

13. *Cenomyce uncialis*, nat. size.

14. *Bæomyces rufus*, upper fig. nat. size. *a*, The podetium and fructification divided.

15. A portion of the crust of *Isidium corallinum*, nat. size. *a*, Part of the same, shewing the fructification.

16. Thallus of *Sphærophoron fragile*, nat. size, in fructification.

17. Thallus of *Ramalina fraxinea*, nat. size, in fructification. *a*, An apothecium divided.

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.

2. *Fusidium flavo-virens*, nat. size, on a leaf.—3. Filaments and 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*.

9. Do. that of *Uredo*. *a*, The sporidia.

Fig. 10. Illustrates that of *Puccinia*. *a–d*, Sporidia of different forms.

11. and 12. illustrate that of *Æcidium*. 13. The sporules.

14. and 15. illustrate that of *Erineum*.

16. Illustrates that of *Physarum*, nat. size.—17. The same; one of the sporangia bursting.

18. Exhibits a *Lycoperdon*, nat. size.

19. *Cyathus crucibulum*, nat. size.—20. One of the lenticular bodies removed (*Sporangiola* of Link).

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 *Hydnum*, (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.

35. *Leotia Mitrula*, nat. size.

36. Explains the genus *Sphæria*, nat. size.—37. Spherules; one of them divided.—38. The tubular cells which contain the sporules.

39. *Cryptosphæria acuta*, nat. size, the epidermis under which the spherules were concealed being removed.—40. A spherule magnified.

41. *Stromatosphæria 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.

1. Salicornia. *Perianth* single, ventricose, entire. *Stam.* 1 or 2. *Seed* 1, included.—Page 1.
2. Hippuris. *Calyx* superior, forming a narrow margin to the germen. *Coroll.* 0. *Seed* 1.—P. 1.

(*Chara* belongs to Cryyt.; *Zostera* to Monœc.; *Valeriana rubra* to Triand.; *Alchemilla arvensis* to Tetrand.)

II. DIGYNIA.

(*Callitriche* belongs to Monœcia.)

II. DIANDRIA.

I. MONOGYNIA.

* *Perianth double, inferior, monopetalous, regular.*

3. Ligustrum. *Coroll.* 4-cleft. *Berry* 4-seeded.—P. 2.

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

4. Veronica. *Coroll.* rotate, 4-cleft, the lower segment narrower. *Caps.* 2-celled.—P. 3.
5. Pinguicula. *Coroll.* ringent, spurred. *Cal.* 4–5-cleft. *Caps.* 1-celled.—P. 5.
6. Utricularia. *Coroll.* ringent, spurred. *Cal.* 2-leaved. *Caps.* 1-celled.—P. 5.

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

7. Salvia. *Coroll.* ringent. *Cal.* 2-lipped. *Filaments* attached laterally to a pedicel.—P. 6.

**** *Perianth double, superior.*

8. Circæa. *Coroll.* 2-petalled. *Cal.* 2-leaved. *Caps.* 2-celled cells 1-seeded.—P. 2.

***** *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.
10. Lemna. *Perianth* single, monophyllous, membranaceous, urceolate. *Caps.* 1-celled. *Plants* minute, frondose.—P. 6. (*Salicornia* belongs to Monand.)

II. DIGYNIA.

11. Anthoxanthum. *Cal. glume* 2-valved, 1-flowered. *Coroll. glume* double, each 2-valved, the external one awned.—P. 7.

III. TRIANDRIA.

I. MONOGYNIA.

* *Flowers superior.*

12. Valeriana. *Cal.* involute, unfolding into a feathery pappus. *Coroll.* monopetalous, 5-cleft, gibbous or spurred at the base. *Seed* 1.—P. 7.
13. Fedia. *Cal.* toothed. *Coroll.* monopetalous, 5-cleft, gibbous at the base. *Fruit* 3-celled, 2 mostly abortive.—P. 8.
14. Iris. *Perianth* single, 6-partite, the alternate petal-like segments reflexed. *Stigma* petaliform.—P. 9.

** *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.
16. Scirpus. *Cal. glumes* imbricated on all sides, 1-valved, 1-flowered, outermost one sometimes sterile. *Coroll.* 0. *Seed* mostly with 6 bristles at the base.—P. 10.
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.
18. Nardus. *Cal.* 0. *Glume* of the *coroll.* 2-valved.—P. 13.

II. DIGYNIA.

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

† *Corolla* 1-*valved.*

19. Alopecurus. *Cal.* 2-valved. *Valves* simple, and acute at the apex, united at the base. *Coroll.* awned at the base.—P. 14.

†† *Corolla 2-valved.*

20. PHLEUM. *Cal.* 2-valved, *valves* mucronate. *Coroll.* 2-valved, awnless, included. *Seed* free.—P. 15.
21. PHALARIS. *Cal.* 2-valved, *valves* subequal, carinate. *Coroll.* double, included. *Seed* invested by the inner hardened corolla.—P. 14.
22. MILIUM. *Cal.* 2-valved, ventricose. *Seed* invested with the hardened permanent corolla.—P. 15.
23. AGROSTIS. *Cal.* 2-valved, *valves* acute, awnless, longer than the corolla. *Coroll.* slightly hairy at the base. *Seed* free.—P. 16.
24. ARUNDO. *Cal.* 2-valved, (in *A. Phragmites* many-flowered). *Coroll.* surrounded with long hairs. *Seed* free.—P. 17.
25. ROTTBOLLIA. *Cal.* 2-valved, valves lateral. *Flowers* alternate on a jointed rachis.—P. 33.
26. HORDEUM. *Cal.* in threes, 2-valved, valves lateral; intermediate floret with stamens and pistils, lateral ones imperfect. *Coroll.* 2-valved, awned.—P. 32.

** *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.
28. MELICA. *Cal.* 2-valved, 2-flowered, with the rudiment of an intermediate third flower. *Coroll.* awnless. *Seed* covered by the hardened corolla.—P. 20.

†† *Flowers polygamous.*

29. HOLCUS. *Cal.* 2-valved, 2-flowered. *Coroll.* 2-valved, antheriferous one awned. *Seed* free.—P. 18.

*** *Calyx many-flowered.*

† *Calyx 1-valved.*

30. LOLIUM. *Cal.* lateral, fixed. *Coroll.* 2-valved, valves lanceolate.—P. 32.

†† *Calyx 2-valved.*

31. POA. *Coroll.* 2-valved, valves ovate, subacute, awnless. *Seed* free, covered by the corolla.—P. 21.
32. BRIZA. *Coroll.* 2-valved, ventricose, valves cordate, obtuse. *Seed* adnate with the corolla.—P. 24.
33. DACTYLIS. Valves of the *calyx* unequal, the larger one keeled. *Coroll.* 2-valved, awnless. *Seed* adnate with the hardened corolla.—P. 24.

34. Festuca. *Cal.* valves opposite, unequal. *Coroll.* 2-valved, valves lanceolate, ext. one acuminate or awned.—P. 25.
35. Triticum. *Cal.* valves opposite, subequal. *Coroll.* 2-valved, ext. valve acuminate or awned. *Rachis* flexuose, toothed.—P. 31.
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.

39. Montia. *Cal.* 2-leaved. *Coroll.* 1-petalled. *Caps.* 3-valved, 3-seeded.—P. 33.

IV. TETRANDRIA.

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.

47. Cornus. *Cal.* 4-toothed. *Pet.* superior, without a nectary. *Nut* of the *Drupe* 2-celled, 2-seeded.—P. 38.

** *Perianth single.*

48. Parietaria. *Perianth* 4-cleft, inferior. *Filaments* elastic. *Fruit* 1-seeded, inclosed in the enlarged perianth. A few florets only pistilliferous.—P. 39.

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.

50. Ilex. *Coroll.* rotate, 4–5-cleft. *Stigmas* sessile. *Berry* containing four 1-seeded nuts. Some flowers only antheriferous.—P. 40.

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

52. Potamogeton. *Perianth* single, 4-leaved. *Anthers* sessile. *Seeds* 4, naked, sessile.—P. 40.

53. Ruppia. *Perianth* 0. *Seeds* (*Drupes*, Hook.) 4, pedicellate. (*Flowers* 2 on a spadix.)—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.*

54. Echium. *Coroll.* irregular, orifice naked. *Stigma* bipartite.—P. 47.

55. Pulmonaria. *Coroll.* infundibuliform, orifice naked. *Cal.* prismatic.—P. 45.

56. Lithospermum. *Coroll.* infundibuliform, orifice naked. *Cal.* not prismatic.—P. 44.

†† *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,
63. Asperugo. *Coroll.* shortly infundibuliform, the orifice closed with convex scales. *Cal.* segments unequal. *Nuts* covered with the compressed calyx.—P. 46.

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

64. Anagallis. *Cal.* 5-partite. *Coroll.* rotate. *Stam.* hairy. *Caps.* bursting transversely all round.—P. 49.
65. Lysimachia. *Cal.* 5-partite. *Coroll.* rotate. *Caps.* 1-celled, 10-valved.—P. 48.
66. Primula. *Cal.* 5-toothed. *Coroll.* hypocrateriform, the tube cylindrical, orifice naked. *Stigma* globose. *Caps.* 1-celled, bursting at the apex, and 5-toothed.—P. 47.
67. Menyanthes. *Cal.* 5-cleft. *Coroll.* hairy. *Stigma* 2-cleft. *Caps.* 1-celled, 2-valved.—P. 48.
68. Hyoscyamus. *Cal.* 5-cleft. *Coroll.* infundibuliform, the lobes obtuse. *Stigma* capitate. *Caps.* 2-celled, operculate.—P. 53.
69. Verbascum. *Cal.* 5-partite. *Coroll.* rotate, irregular. *Stam.* declined, mostly hairy. *Caps.* 1-celled, 2-valved.—P. 53.
70. Erythræa. *Cal.* 5-cleft. *Coroll.* infundibuliform, the limb short. *Anthers*, after flowering, spirally twisted. *Style* erect. *Stigmas* 2. *Caps.* linear, 2-celled. *Br.*—P. 54.
71. Convolvulus. *Cal.* 5-cleft. *Coroll.* campanulate, plicate. *Stigmas* 2. *Caps.* 2–3-celled, 2–3-valved. *Cells* mostly 2-seeded.—P. 49.
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.
73. Vinca. *Coroll.* hypocrateriform, twisted. *Follicles* 2, erect. *Seeds* naked, (destitute of seed-down).—P. 57.
74. Solanum. *Coroll.* rotate. *Anthers* opening with two pores at the extremity. *Berry* 2-celled.—P. 54.
75. Atropa. *Coroll.* campanulate. *Stamens* distant. *Berry* 2-celled.—P. 53.

*** *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.

77. Campanula. *Coroll.* campanulate. *Filaments* broader at the base. *Stigma* 3-cleft. *Caps.* 3–5-celled, laterally perforate.—P. 50.

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

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

79. Euonymus. *Cal.* plane, 4–5-cleft. *Caps.* 5-angled, 5-celled, 5-valved. *Seeds* covered with an arillus,—P. 55.

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.*

81. Ribes. *Cal.* 5-cleft, bearing the *Petals* and *Stamens*. *Style* bifid. *Berry* 1-celled, many-seeded.—P. 56.

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

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

83. Glaux. *Perianth* single, inferior, coloured, 5-lobed. *Caps.* globose, 1-celled, 5-valved, 5-seeded.—P. 56.

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.

89. Ulmus. *Perianth* single, inferior, persistent, 4–5-cleft. *Caps.* membranous, compressed, 1-seeded.—P. 59.
(*Scleranthus* belongs to Decand. Digyn.)

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

A. *Umbels irregular. Flowers forming a roundish head.*

90. Eryngium. *Flowers* capitate. *Receptacle* chaffy. *Involucre* subspinose. *Fruit* bristly.—P. 61.

91. Sanicula. *Umbellules* capitate. *Flowers* polygamous. *Fruit* clothed with hooked bristles.—P. 61.

92. Hydrocotyle. *Umbel* imperfect, forming a head of flowers. *Petals* entire, equal. *Fruit* roundish, laterally compressed, veined. *Leaves* roundish.—P. 61.

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).*

93. Crithmum. *Cal.* entire. *Petals* uniform, entire, broadest at the base. *Fruit* oval, striate.—P. 62.

94. Œnanthe. *Involucre* sometimes wanting. *Involucella* many-leaved. *Flowers* radiate, polygamous. *Fruit* prismatic, 5-ribbed, crowned with the calyx and styles. P. 62.

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. Thyssellinum. *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. *Involucre* 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. *Involucre* 0. *Flowers* all fertile, those of the disk smallest. *Fruit* ovate, smooth, crowned with the calyx and styles.—P. 66.
104. Æthusa. *Involucre* 0. *Involucella* 3-leaved, deflexed, all on one side. *Fruit* ovate, with 5 acute ribs.—P. 66.
105. Cicuta. *Involucre* almost always 0. *Fruit* ovate, with 5 ribs; the intermediate spaces prominent.—P. 66.
106. Imperatoria. *Involucre* 0. *Fruit* roundish, compressed, with a winged border, 3-ribbed; *Ribs* obtuse, prominent, the intermediate spaces sulcate.—P. 67.
107. Myrrhis. *Involucre* 0. *Fruit* beaked at the apex, and crowned with the styles, 5-ribbed; *Ribs* acute.—P. 67.
108. Chærophyllum. *Involucre* 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. *Involucre* 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. *Involucre* 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, every where clothed with bristles. —P. 70.

115. DAUCUS. *Involucre* pinnatifid or pinnate. *Flowers* subradiate. *Fruit* oval or oblong, 5-ribbed; *Ribs* muricated, 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.* monopetalous, 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, scariose, plicate. *Coroll.* 5-petalled. *Seed* 1, invested with the calyx.—P. 73.

VI. HEXAGYNIA.

123. DROSERA. *Coroll* 5-petalled. *Caps.* 1-celled, 3–5-valved, many-seeded.—P. 74.

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.

125. PEPLIS. *Cal.* 12-cleft, segments alternately smaller. *Coroll.* 6-petalled, (sometimes absent). *Caps.* superior, 2-celled.—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.*

134. JUNCUS. *Perianth* 6-leaved, glumaceous. *Caps* superior, 3-celled, 3-valved. *Seeds* many. (*Leaves* mostly rounded, glabrous.)—P. 77.

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. TRIGYNIA.

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.

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.

141. VACCINIUM. *Cal.* 4-toothed, superior. *Coroll.* campanulate, monopetalous. *Anthers* with 2 pores. *Berry* 4-celled, many-seeded.—P. 87.

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 DECAND. DIGYNIA.)

II. TRIGYNIA.

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

III. TETRAGYNIA.

146. ADOXA. *Cal.* half-inferior, 3-cleft. *Coroll.* superior, 4–5-cleft. *Anthers* terminal, 1-celled. *Berry* 4-celled. —P. 91.

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 Octand 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.

160. Oxalis. *Cal.* 5-partite. *Coroll.* 5-petalled. *Caps.* angled, 5-celled. *Seeds* with an elastic arillus.—P. 101.

161. LYCHNIS. *Cal.* monophyllous, tubular, membranaceous, 5-toothed. *Petals* 5, clawed, the limb divided. *Caps.* 1–5-celled.—P. 102.

162. AGROSTEMMA. *Cal.* monophyllous, tubular, coriaceous, 5-cleft. *Petals* 5, clawed, the limb undivided. *Caps.* 1-celled.—P. 101.

163. CERASTIUM. *Cal.* 5-leaved. *Petals* 5, cloven. *Caps.* 1-celled, bursting at the summit with 5 or 10 teeth.—P. 102.

164. SPERGULA. *Cal.* 5-leaved. *Petals* 5, undivided. *Caps.* ovate, 5-celled, 5-valved.—P. 104.

(*Silene inflata*, belongs to ORD. TRIGYNIA.)

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.

166. RESEDA. *Cal.* monophyllous, cleft. *Petals* laciniate. *Caps.* 1-celled, open at the apex.—P. 105.

167. EUPHORBIA. *Perianth* single, monophyllous, inferior. *Nectaries* 4–5, inserted upon the perianth. *Caps.* pedicellate, 3-lobed.—P. 106.

TETRAGYNIA.

(*Potentilla Tormentilla*, belongs to ICOSAND. POLYG.)

III. DODECAGYNIA.

168. SEMPERVIVUM. *Cal.* 12-partite. *Coroll.* 12-petalled. *Caps.* 12.—P. 107.

XII. ICOSANDRIA.

I. MONOGYNIA.

169. PRUNUS. *Cal.* inferior, 5-cleft. *Coroll.* 5-petalled. *Nut* of the *Drupe* with slightly prominent seams.—P. 107.

(*Cratægus Oxyacantha*, belongs to ORD. PENTAGYNIA.)

(*Cratægus Oxyacantha*, *Pyrus Aucuparia*, and *Aria* occur sometimes with 2, 3, or 4 styles, but belong to ORD. PENTAGYNIA).

II. PENTAGYNIA.

170. Cratægus. *Cal.* superior, 5-cleft. *Coroll.* of 5 patent round petals. *Style* glabrous. *Fruit* fleshy, closed, 5-celled, *nuts* bony, 2-seeded.—P. 109.

171. Pyrus. *Cal.* superior, 5-cleft. *Coroll.* of 5 roundish petals. *Fruit* closed, 5-celled; *cells* 2-seeded.—P. 109.

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

III. POLYGYNIA.

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. (*Spiræa Filipendula* and *Ulmaria* belong to Ord. Pentagynia).

XIII. POLYANDRIA.

I. MONOGYNIA.

* *Petals* 4.

179. Papaver. *Cal.* 2-leaved, caducous. *Pet.* 4. *Stigma* radiate. *Caps.* superior, discharging its seeds by pores under the permanent stigma.—P. 119.

180. Chelidonium. *Cal.* 2-leaved, caducous. *Pet.* 4. *Stigma* 2-lobed. *Pod* linear, 1-celled, 2 valved. *Seeds* numerous, crested, free.—P. 119.

181. Glaucium. *Cal.* 2-leaved, caducous. *Pet.* 4. *Stigma* 2-lobed. *Pod.* linear, 1-celled, 2-valved. *Seeds* many,

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. NYMPHÆA. *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.

187. STRATIOTES. *Spatha* 2-leaved. *Cal.* 3-cleft. *Coroll.* 3-petalled. *Berry* inferior, 6-celled, many-seeded.—P. 122.

(*Reseda Luteola* belongs to DODECAND. TRIG. *Helleborus* to ORD. POLYG.)

III. POLYGYNIA.

* *Pericarps indehiscent, 1-seeded.*

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

189. CLEMATIS. *Perianth* single, 4–6-leaved. *Pericarps* with a long, mostly feathery awn.—P. 122.

190. ANEMONE. *Involucre* remote from the flower, of 3 divided leaves. *Perianth* single, petaloid, 5–9-leaved.—P. 122.

191. RANUNCULUS. *Cal.* 5-leaved. *Pet.* 5, with a nectiferous pore at the base. *Pericarps* shortly mucronate.—P. 123.

192. FICARIA. *Cal.* 3-leaved, caducous. *Pet.* 9, with a nectiferous pore at the base. *Pericarps* smooth, obtuse.—P. 126.

** *Pericarps dehiscent, many-seeded.*

193. CALTHA. *Perianth* single, 5-leaved, petaloid. *Pericarps* spreading.—P. 127.

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

195. Helleborus. *Cal.* 5-leaved, subcoriaceous, persistent. *Pet.* 8–10, very small, tubular, nectiferous. *Pericarps* compressed, suberect. (*Hook*).—P. 127.

XIV. DIDYNAMIA.

I. GYMNOSPERMIA.

* *Calyx* 5- *or* 10-*cleft, subregular.*

196. Leonurus. *Cal.* 5-angled. *Anthers* sprinkled with shining dots.—P. 133.

197. Glechoma. Upper lip of *Coroll.* bifid. *Anthers* approaching in pairs, and forming a cross.—P. 130.

198. Mentha. *Coroll.* subregular, 4-lobed. *Stam.* erect, distant.—P. 128.

199. Teucrium. Upper lip of *Coroll.* short, 2-partite. *Stam.* projecting through the cleft.—P. 128.

200. Ajuga. Upper lip of *Coroll.* very minute. *Stam.* exserted. *Anth.* reniform, 1-celled.—P. 128.

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.

203. Galeopsis. Upper lip of *Coroll.* vaulted, notched, lower one 3-lobed, 2-dentate above.—P. 131.

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

205. Ballota. *Cal.* 10-ribbed. Upper lip of *Coroll.* concave, notched.—P. 132.

206. Marrubium. *Cal.* 10-ribbed. Upper lip of *Coroll.* linear, straight, cloven.—P. 133.

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

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

208. Thymus. Mouth of the *Cal.* closed with hairs. *Coroll.* 2-lipped.—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.*

212. LATHRÆA. *Coroll.* tubular, 2-lipped. *Germen* with a gland at the base. *Caps.* 1-celled.—P. 135.

213. BARTSIA. *Coroll.* ringent, upper lip concave, longest, entire. *Caps.* ovate, compressed, 2-celled. *Seeds* many, angular.—P. 134.

214. RHINANTHUS. *Cal.* inflated. Upper lip. of *Coroll.* laterally compressed. *Caps.* 2-celled, compressed. *Seeds.* many, plane.—P. 135.

215. MELAMPYRUM. Upper lip of *Coroll.* compressed. *Caps.* oblong, 2-celled, 2-seeded. *Seeds* gibbous, smooth.—P. 135.

216. EUPHRASIA. Upper lip of *Coroll.* divided. Lobes of the *anthers* mucronate. *Caps.* ovate-oblong, 2-celled. *Seeds* striate.—P. 135.

** *Calyx 5-cleft.*

217. SCROPHULARIA. *Coroll.* very short; *limb* shortly 2-lipped, with an internal intermediate scale. *Caps.* 2-celled. P. 137.

218. DIGITALIS. *Cal.* 5-partite. *Coroll.* tubulato-campanulate, ventricose beneath. *Caps.* ovate, 2-celled, many-seeded.—P. 138.

219. ANTIRRHINUM. *Cal.* 5-partite. *Coroll.* personate, with a prominent or spurred nectary at the base. *Caps* 2-celled.—P. 136.

220. PEDICULARIS. *Cal.* inflated. Upper lip of *Coroll.* arched, laterally compressed. *Caps.* compressed, 2-celled. *Seeds* angular.—P. 136.

221. VERBENA. *Coroll.* infundibuliform; *limb* 5-cleft, unequal. *Stam* 2–4. *Seeds* 2–4, enclosed in a thin evanescent *pericarp.* (*Hook*).—P. 138.

*** *Calyx 2-leaved.*

222. OROBANCHE. *Cal.* of 2 lobed leaves. *Coroll.* ringent. *Caps.* 1-celled, 2-valved, many-seeded.—P. 138.

XV. TETRADYNAMIA *.

I. SILICULOSA.

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.

224. CORONOPUS. *Pouch* 2-lobed, without valves, wingless; *cells* 1-seeded. *Cotyledons* incumbent, linear.—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. LEPIDIUM. *Pouch* with 1-seeded cells, their valves carinate. *Petals* equal.—P. 140.

227. COCHLEARIA. *Pouch* subovate, many-seeded, the valves turgid. *Seeds* not margined, their *cotyledons* accumbent. The shorter *filaments* without teeth. *Cal.* patent.—P. 140.

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.

230. CAMELINA. *Pouch* subovate, many-seeded; the valves turgid. *Cotyledons* incumbent. *Filaments* without teeth. —P. 142.

II. SILIQUOSA.

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

232. ARABIS. *Pod* linear, crowned with the nearly sessile stigma; valves veined or nerved. *Seeds* in 1 row. *Cotyledons* accumbent. *Cal.* erect.—P. 143.

233. BARBAREA. *Pod* 4-edged. *Cotyledons* accumbent. *Seeds* in 1 row. *Cal.* erect. Shorter *filaments* with intermediate glands.—P. 143.

234. NASTURTIUM. *Pod* rounded, (sometimes short); valves concave, nerveless, not carinate. *Cotyledons* accumbent. *Cal.* patent.—P. 144.

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* 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.

235. SISYMBRIUM. *Pod* rounded or angular. *Cotyledons* incumbent (sometimes obliquely), plane. *Cal.* patent, sometimes suberect.—P. 145.

236. ERYSIMUM. *Pod* 4-sided. *Seeds* not margined. *Cotyledons* incumbent. *Stigma* capitate, sometimes notched, with the lobes patent. *Cal.* closed.—*

237. CHEIRANTHUS. *Pod* compressed or 2-edged. *Cotyledons* accumbent. *Cal.* closed; opposite leaflets saccate at the base. *Stigma* on a style, 2-lobed, the lobes patent or capitate.—P. 145.

238. HESPERIS. *Pod* 4-sided or 2-edged. *Stigma* subsessile, the lobes connivent. *Cotyledons* incumbent, plane. *Cal.* closed.—P. 146.

239. BRASSICA. *Pod* 2-valved, (with an abortive or 1-seeded beak). *Cotyledons* conduplicate. *Cal.* closed.—P. 146.

240. SINAPIS. *Pod* 2-valved, (sometimes of 2 articulations, of which the upper one is valveless). *Cotyledons* conduplicate. *Seeds* subglobose in a single series. *Cal.* patent.—P. 147.

241. DIPLOTAXIS. (De Candolle). *Pod* 2-valved, compressed; valves with a nerve in the middle. *Cotyledons* conduplicate. *Seeds* ovate, in a double row, (sometimes partly in 1 row, from abortion).—P. 147.

242. RAPHANUS. *Pod* valveless. *Cotyledons* conduplicate. *Cal.* closed.—P. 148.

XVI. MONADELPHIA.

I. PENTANDRIA.

243. ERODIUM. Monogynous. *Stam.* 5, perfect, alternating with 5 imperfect filaments. *Fruit* beaked, separating into 5, 1-seeded capsules, each with a spiral awn, bearded on the inside.—P. 148.

(*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

1. E. *Alliaria*, leaves cordate, petiolate, dentato-crenate. *Lightf.* p. 356. *Smith*, Fl. Brit. p. 708. *Hook.* Fl. Scot. p. 202. E. B. t. 796.

HAB. Hedge-banks and waste places, frequent. May—July. ♂.

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.

II. DECANDRIA.

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

(*Oxalis* belongs to DECAND. PENTAG.)

III. POLYANDRIA.

245. LAVATERA. Polygynous. *Cal.* double, external one 3-cleft. *Caps.* many, circularly arranged, 1-seeded.—P. 153.

246. MALVA. Polygynous. *Cal.* double, external one 8-leaved. *Caps.* many, circularly arranged, 1-seeded.—P. 152.

XVII. DIADELPHIA.

I. HEXANDRIA.

247. FUMARIA. *Cal.* 2-leaved. *Pet.* 4. *Pouch* ovate or globose, indehiscent, 1-seeded.—P. 153.

248. CORYDALIS. *Cal.* 2-leaved. *Pet.* 4. *Pod* 2-valved, compressed, dehiscent, oblong or linear.—P. 153.

II. OCTANDRIA.

249. POLYGALA. *Cal.* 5-leaved, two of them wing-shaped and coloured. *Caps.* compressed, obcordate.—P. 154.

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.

253. ONONIS. *Cal.* 5-partite. *Standard* of *Coroll.* striate. *Legume* turgid, sessile.—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.

257. Ervum. *Stigma* capitate, every where 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.

263. Hypericum. *Cal.* 5-partite, inferior. *Coroll.* 5-petalled. *Filaments* many, united at the base in 3–5 bundles. *Caps.* many-seeded.—P. 163.

XIX. SYNGENESIA.

I. POLYGAMIA ÆQUALIS.

* *Corollas all ligulate.* Semifloscvlosi.

264. Hypochæris. *Involucre* oblong, imbricated. *Receptacle* chaffy. *Pappus* feathery, stipitate or sessile.—P. 170.

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

266. Crepis. *Involucre* surrounded with deciduous scales, and at length torulose. *Receptacle* roughish. *Pappus* sessile.—P. 170.

267. Hieracium. *Involucre* ovate, imbricated. *Receptacle* nearly naked, dotted. *Pappus* simple, sessile.—P. 167.

268. Apargia. *Involucre* imbricated, with scales at the base. *Receptacle* naked, dotted. *Pappus* feathery, sessile, unequal.—P. 167.

269. TRAGOPOGON. *Involucre* simple, many-leaved. *Receptacle* naked. *Pappus* feathery, stipitate. "*Pericarps* longitudinally striate."—P. 165.

270. LEONTODON. *Involucre* imbricated with somewhat lax scales. *Receptacle* naked. *Pappus* simple, stipitate.—P. 166.

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

272. SONCHUS. *Involucre* imbricated, swelling at the base. *Receptacle* naked. *Pappus* simple, sessile.—P. 165.

273. LAPSANA. *Involucre* with scales at the base, its inner leaves equal, channelled. *Receptacle* naked. *Pappus* 0. —P. 170.

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

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

275. CARDUUS. *Involucre* ventricose, imbricated with spinous scales. *Receptacle* hairy. *Pappus* deciduous, roughish. —P. 171.

276. CNICUS. *Involucre* ventricose, imbricated with spinous scales. *Receptacle* hairy. *Pappus* deciduous, feathery. —P. 172.

277. ONOPORDON. *Involucre* ventricose, imbricated with spreading spinous scales. *Receptacle* pitted. *Pappus* deciduous, rough.—P. 174.

(*Centaurea Jacea* belongs to POLYG. FRUSTRANEA.)

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

278. EUPATORIUM. *Involucre* imbricated, oblong. *Florets* few. *Receptacle* naked. *Pappus* rough.—P. 174.

279. BIDENS. *Involucre* many-leaved, bracteated at the base. *Receptacle* chaffy. *Coroll.* sometimes radiate. *Pappus* rough with deflexed bristles.—P. 174.

II. POLYGAMIA SUPERFLUA.

* *Ray of the Corolla obsolete.* DISCOIDEI.

280. GNAPHALIUM. *Involucre* imbricated, the scales scariose, and often coloured. *Receptacle* naked. *Florets* of the radius subulate. *Pappus* rough.—P. 176.

281. ARTEMISIA. *Involucre* ovate, imbricated. *Receptacle* naked or villose. *Florets* of the ray subulate. "*Pericarps* crowned with a membranaceous *pappus*."—P. 175.

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

* *Corollas of the ray ligulate.* RADIATI.

282. BELLIS. *Involucre* hemispherical, the scales equal. *Receptacle* naked, conical. *Pappus* 0.—P. 182.

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

284. CHRYSANTHEMUM. *Involucre* hemispherical, imbricated; scales with membranaceous margins. *Receptacle* naked. *Pappus* 0.—P. 180.

285. PYRETHRUM. *Involucre* hemispherical, imbricated; scales with membranaceous margins. *Receptacle* naked. *Pericarps* crowned with a membranaceous border.—P. 180.

286. DORONICUM. *Scales* of the *involucre* in 2 equal rows, longer than the disk. *Receptacle* naked. *Pericarps* of the ray without a *pappus*.—P. 179.

287. SOLIDAGO. *Involucre* imbricated, the scales connivent. *Receptacle* naked. *Florets* about 5, uniform in colour. *Pappus* rough.—P. 179.

288. ASTER. *Involucre* imbricated, lowest scales spreading, (except in *A. Tripolium*). *Receptacle* naked. *Florets* of the ray more than 10. *Pappus* simple—P. 179.

289. SENECIO. *Involucre* subcylindrical, equal, scaly below; scales withered at the apex. *Receptacle* naked. *Pappus* simple.—P. 178.

290. TUSSILAGO. *Involucre* simple, equal, submembranaceous, swelling. *Receptacle* naked. *Pappus* simple.—P. 177.

291. ANTHEMIS. *Involucre* hemispherical; scales nearly equal, with scariose margins. *Receptacle* convex, chaffy. *Pericarps* crowned with a membranaceous border.—P. 181.

292. ACHILLEA. *Involucre* ovate, imbricated, unequal. *Receptacle* plane, chaffy. *Florets* of the ray 5–10, roundish-obcordate. *Pericarps* without *pappus* or border.—P. 182.

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

III. POLYGAMIA FRUSTRANEA.

293. CENTAUREA. *Involucre* 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.*

294. Orchis. *Coroll.* ringent. *Lip* spurred at the base beneath. *Glands* of the stalks of the *pollen-mass* contained in one common little pouch.—P. 183.

295. Gymnadenia. *Coroll.* ringent. *Lip* spurred at the base beneath. *Glands* of the stalks of the *pollen-mass* naked, approximate.—P. 184.

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 farinaceous, or composed of angular granules, fixed to the stigma by its extremity.*

297. Listera. *Coroll.* irregular. *Lip* 2-lobed. *Column* wingless. *Anther* fixed by its base. *Pollen* farinaceous.—P. 186.

*** *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* farinaceous.—P. 186.

299. Corallorrhiza. *Lip* produced behind, adnate with the spur, or free. *Column* free. *Masses* of *Pollen* 4, oblique.—P. 187.

XXI. MONŒCIA.

I. MONANDRIA.

300. Zannichellia. *Barren Fl. Perianth* 0.—*Fertile Fl. Perianth* single, 1-leaved. *Germ.* 4 or more. *Style* 1. *Stigma* peltate.—P. 187.

301. Callitriche. *Barren Fl. Perianth* single, 2-leaved. *Anther* 1-celled—*Fertile Fl. Styles* 2. *Pericarp* of 4 deep compressed lobes; *cells* 1-seeded.—P. 188.

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* The characters of the Orchideous genera are those established by Mr R. Brown, and also given in *Hooker's Fl. Scotica.*

302. ZOSTERA. *Fructification* in 2 rows on one side of a *spadix*. *Spatha* foliaceous. *Anthers* ovate, sessile, alternating with the germens. *Germens* with a bifid *style*. *Drupe* 1-seeded. (*Hook*).—P. 188.
(*Chara* belongs to CRYPTOG. CHARACEÆ.)

II. TRIANDRIA.

303. SPARGANIUM. *Flowers* in spherical heads. *Barren Fl. Perianth* single, 3-leaved—*Fertile Fl. Perianth* single, 3-leaved, *Drupe* dry, 1-seeded.—P. 189.

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.

306. LITTORELLA. *Barren Fl. Cal.* 4-leaved. *Coroll.* 4-cleft. *Stam.* very long.—*Fertile Fl. Cal.* 0. *Coroll.* 3-cleft. *Style* long. *Nut* 1-seeded.—P. 200.

307. URTICA. *Barren Fl. Perianth* single, 4-leaved. *Fertile Fl. Perianth* single, 2-leaved. *Pericarp* 1-seeded, shining—P. 201.

308. ALNUS. *Flowers* forming an imbricated catkin. *Barren Fl. Scales* of the *Catkin* 3-lobed, 3-flowered. *Perianth* single, 4-partite. *Fertile Fl. Scale* 2-flowered. *Perianth* 0. *Styles* 2. *Fruit* compressed.—P. 201.

PENTANDRIA.

(*Fagus sylvaticus*, and *Quercus*, belong to ORD. POLYANDRIA.)
(*Atriplex portulacoides*, to POLYGAMIA.)

HEXANDRIA.

(*Quercus* belongs to ORD. POLYANDRIA.)

IV. POLYANDRIA.

309. MYRIOPHYLLUM. *Barren Fl. Cal.* 4-leaved. *Coroll.* 4-petalled. *Stam.* 8.—*Fertile Fl. Cal.* and *Coroll.*, each of 4 leaves. *Stigmas* 4, sessile. *Nuts* 4, 1-seeded.—P. 202.

310. CERATOPHYLLUM. *Barren Fl. Perianth* multipartite. *Stam.* 16–20.—*Fertile Fl. Perianth* multipartite. *Stigm.* subsessile. *Nut* 1-seeded.—P. 201.

311. FAGUS. *Barren Fl.* in a globose catkin. *Perianth* single, 1-leaved, campanulate, 6-cleft. *Stam.* 5–12.—*Fertile Fl.* 2. *Involucre* 4-lobed, prickly. *Perianth* single, 4–5 cleft. *Styles* 3. *Nuts* 1-seeded, invested with the enlarged involucre.—P. 203.

312. CASTANEA. *Barren Fl.* in a long cylindrical catkin. *Perianth* single, 1-leaved, 6-cleft. *Stam.* 5-20.—*Fertile Fl.* 3. *Involucre* 4-lobed, thickly muricate. *Perianth* single, 5–6-lobed. *Styles* 6. *Nut* 1–2-seeded, invested with the enlarged involucre.—P. 203.

313. QUERCUS. *Barren Fl.* in a lax catkin. *Perianth* single, sub-5-cleft. *Stam.* 5–10.—*Fertile Fl. Involucre* cup-shaped, scaly. *Perianth* single, 6-lobed. *Style* 1. *Stigmas* 3. *Nut* 1-celled, 1-seeded, surrounded at the base with the enlarged involucre.—P. 202.

314. CORYLUS. *Barren Fl.* in a cylindrical catkin, its scales 3-cleft. *Perianth* 0. *Stam.* 8. *Anth.* 1-celled.—*Fertile Fl. Perianth* obsolete. *Germens* several. *Stigm.* 2. *Nut* 1-seeded, ovate, more or less surrounded with the enlarged, coriaceous, scaly involucre.—P. 204.

315. CARPINUS. *Barren Fl.* in a cylindrical catkin; its scales ciliate at the base. *Stam.* 8–20.—*Fertile Fl.* in a lax catkin; its scales large, 3-lobed, 1-flowered. *Perianth* single, 1-leaved, 6-dentate. *Styles* 2. *Nut* ovate, striate, 1-seeded.—P. 203.

316. BETULA. *Barren Fl.* in a cylindrical catkin, its scales 3-flowered. *Perianth* 0. *Stam.* 10–12.—*Fertile Fl. Scales* of the catkin 3-flowered. *Perianth* 0. *Styles* 2. *Nuts* compressed, with a membranaceous margin, 1-seeded.—P. 203.

317. ARUM. *Spatha* 1-leaved, convolute at the base. *Perianth* 0. *Spadix* naked above, bearing sessile anthers below the middle, and *germens* at the base. *Berry* 1-celled, 1-seeded.—P. 202.

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. DIŒCIA.

MONANDRIA.

(*Salix Lambertiana* belongs to Ord. Diandria.)

I. DIANDRIA.

319. Salix. *Barren Fl. Scales* of the *Catkin* 1-flowered, with a nectariferous gland at the base. *Perianth* 0. *Stam* 1–5. —*Fertile Fl. Scales* 1-flowered. *Perianth* 0. *Stigm.* 2. *Caps.* 1-celled, 2-valved, many-seeded. *Seeds* carnose —P. 204.

II. TRIANDRIA.

320. Empetrum. *Barren Fl. Cal.* 3-partite. *Coroll.* 3-petalled. *Stam.* 3.—*Fertile Fl. Cal.* 3-partite. *Coroll.* 3-petalled. *Stigma* 6–9-rayed. *Berry* superior, globose, 6–9-seeded.—P. 209.

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

TETRANDRIA.

(*Urtica dioica* belongs to Monœcia.)

III. PENTANDRIA.

321. Humulus. *Barren Fl. Perianth* single, 5-leaved. *Anth.* with 2 pores.—*Fertile Fl. Scales* of the catkin large, concave, entire, oblique, 1-flowered. *Perianth* 0. *Styles* 2. *Seed* 1.—P. 209.

(*Salix pentandra* belongs to Ord. Diand.)

IV. OCTANDRIA.

322. Populus. *Barren Fl. Scales* of the catkin laciniate. *Anth.* 8–30. *Perianth* single, oblique, turbinate, entire.—*Fertile Fl. Scales* laciniate. *Perianth* turbinate, entire. *Stigmas* 4. *Caps.* superior, 2-celled, 2-valved, many-seeded. *Seeds* comose.—P. 210.

V. ENNEANDRIA.

323. Mercurialis. *Barren Fl. Perianth* single, 3-partite. *Stam.* 9–12. *Anth.* globose, 2-lobed.—*Fertile Fl. Perianth* single, 3-partite. *Styles* 2. *Caps.* 2-celled; *cells* 1-seeded.—P. 210.

324. Hydrocharis. *Barren Fl. Cal.* 3-partite. *Coroll.* 3-petalled.—*Fertile Fl. Cal.* 3-partite. *Coroll.* 3-petalled. *Styles* 6. *Caps.* inferior, 6-celled, many-seeded.—P. 211.

(*Empetrum* belongs to Ord. Triand.)

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. MONŒCIA.

326. ATRIPLEX. *Perfect Fl. Perianth* single, 5-partite, inferior. *Stam.* 5. *Style* 2-partite. *Fruit* depressed, 1-seeded, covered by the *calyx*.—*Pistilliferous Fl. Perianth* single, 2-partite. *Stam.* 0.—P. 211.

XXIV. CRYPTOGAMIA.

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 PILULARIA. *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 corpuscules. Stems herbaceous or woody, simple or branched, erect or creeping. Leaves undivided, small, numerous.

329. LYCOPODIUM. *Capsules* 1-celled, axillary, sessile; sometimes 2-valved, filled with a farinaceous substance; others 3-valved, containing 1–6 globose corpuscules. *Br.* —P. 215.

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.*

330. OPHIOGLOSSUM. *Stem* 1-leaved, produced above into an elongated peduncle. *Capsules* on a distichous spike, connate, opening transversely.—P. 217.

331. BOTRYCHIUM. *Fructification* pedunculate. *Capsules* subglobose, distinct, adnate with the compound *rachis*, opening transversely.—P. 217.

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 inflexed margin of the frond.—P. 218.

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

335. ASPLENIUM. *Sori* linear, transverse, scattered. *Involucre* opening towards the midrib.—P. 219.

** *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 (*thecæ*) 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. ANDRÆA. *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.*

340. SPHAGNUM. *Receptacle* of the theca pedunculated. *Peduncle* resembling a *seta.* *Theca* sessile on the receptacle. *Mouth* naked.—P. 223.
341. GYMNOSTOMUM. *Seta* terminal. *Calyptra* dimidiate. *Mouth* of the *theca* naked.—P. 226.
342. ANICTANGIUM. *Seta* terminal. *Calyptra* mitriform. *Mouth* of the *theca* naked.—P. 229.

DIV. II. *Mouth of the theca furnished with a peristome.*

A. *Peristome single.*

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

343. TETRAPHIS. *Seta* terminal. *Peristome* of 4 erect teeth.—P. 230.
344. SPLACHNUM. *Seta* terminal. *Peristome* single, of 8 geminate teeth. *Theca* with an evident apophysis. *Columella* exserted, capitate. *Calyptra* mitriform.—P. 231.
345. ENCALYPTA. *Seta* terminal. *Peristome* single, of 16 teeth. *Calyptra* cylindrico-campanulate, wholly concealing the mature *theca.*—P. 233.
346. GRIMMIA. *Seta* terminal. *Peristome* single, of 16 entire or perforated, rarely cleft, equidistant teeth. *Calyptra* mitriform.—P. 234.
347. TRICHOSTOMUM. *Seta* terminal. *Peristome* single, of 16 equal teeth divided to the base, or 32 in pairs. *Calyptra* mitriform.—P. 242.
348. CINCLIDOTUS. *Seta* terminal. *Peristome* single, of 32 filiform twisted teeth, anastomosing at their base. *Calyptra* mitriform.—P. 231.

** *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, (except in *D. adiantoides* and *D. taxifolium*). *Peristome* single, of 16 bifid, equidistant teeth. *Calyptra* dimidiate.—P. 238.

352. Weissia. *Seta* terminal. *Peristome* single, of 16 entire, equidistant teeth. *Calyptra* dimidiate.—P. 236.

353. Pterogonium. *Seta* lateral. *Peristome* single, of 16 entire, equidistant teeth. *Calyptra* dimidiate.—P. 236.

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.

355. Buxbaumia. *Stem* none. *Theca* oblique, gibbous. *Peristome* double; outer one of many filiform torulose processes; inner one of a conical, plicate membrane. *Calyptra* mitriform.—P. 251.

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 thecæ in a common pedunculated receptacle. *Anthoceros* a linear, 2-valved theca. *Sphærocarpus* obpyriform, sessile receptacles. *Riccia* immersed roundish thecæ.

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 lignoso-coriaceous, 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.* FUCOIDEÆ.

369. LAMINARIA. *Root* fibrous. *Stipes* dilated into a plane frond. *Fructification* naked granules immersed, and forming irregular groups in the frond.—P. 282.

370. FUCUS. *Root* scutate. *Frond* plane or compressed, (rarely filiform), dichotomous. *Fructification*, tubercles contained in a common mucose receptacle, and filled with sporules and filaments.—P. 283.

371. HIMANTHALIA. *Root* scutate. *Frond* linear, compressed, dichotomous, arising from a cyathiform base. *Fructification*, tubercles imbedded in the whole length of the frond.—P. 285.

372. CYSTOSEIRA. *Root* scutate. *Stipes* cylindrical. *Lower leaves* plane; *upper ones* filiform, furnished with innate vesicles. *Fructification*, tubercles in common receptacles, the receptacles with several loculaments.—P. 285.

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.

275. Spongiocarpus. *Root* scutate. *Frond* filiform. *Fructification*, naked, spongy warts, composed of radiating filaments, among which are the sporules.—P. 286.

376. Sporochnus. *Root* mostly scutate. *Frond* plane, with distichous branches, bearing in most instances delicate, pencil-like, deciduous tufts of confervoid filaments. ("*Receptacles* composed of concentric, clavate, articulated *corpuscules*." *Agardh*).—P. 287.

377. Scytosiphon. *Root* scutate. *Frond* filiform, tubular, subcoriaceous. *Fructification*, naked, pyriform granules covering the whole frond.—P. 288.

378. Chordaria. *Root* scutate. *Frond* filiform, of an olive colour, and cartilaginous substance. *Fructification*, clavate or pyriform concentric filaments, constituting the whole frond.—P. 288.

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.* Florideæ.

379. Gigartina. *Root* scutate. *Frond* filiform, much branched. *Fructification* double; capsules and innate clusters of sporules in pod-shaped ramuli.—P. 289.

380. Chondria. *Frond* continuous, gelatinoso-cartilaginous. *Fructification* double; naked granules immersed in the substance of the ramuli and external tubercles.—P. 290.

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

382. Sphærococcus. *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.

384. PTILOTA. *Root* scutate. *Fronds* compressed or plane, pinnate. *Fructification* a cluster of naked granules, surrounded by a linear-cleft involucre.—P. 297.

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.* ULVOIDEÆ.

* *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.

386. ULVA. *Root* scutate. *Frond* plane, (rarely bullate and crisped), membranaceous, rarely coriaceous. *Fructification* naked immersed granules, distributed in fours throughout the frond.—P. 298.

** *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.

388. NODULARIA. *Root* scutate. *Fronds* filiform, mostly simple, torulose externally as if regularly jointed. *Fructification* oblong granules contained in the tubular frond.—P. 300.

389. GLOIONEMA. *Filaments* capillary, tubular, continuous, branched. *Fructification*, granules disposed without order in the gelatinous interior.—P. 301.

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 striæ.—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 striæ.—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.* Vaucherideæ.

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.

395. Bryopsis. *Root* minutely scutate. *Filaments* tubular, continuous, aggregated, branched, pinnate or imbricated upwards with branchlets. *Fructification* a dark internal granular mass (?).—P. 307.

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.* Ectocarpoideæ.

* *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. *Fructifiation* 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 ramuli. *Fructification*, capsules.—P. 312.

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.

406. Fragillaria. *Filaments* jointed, simple, gelatinous, compressed, fragile, separating at the joints.—P. 321.

407. Draparnaldia. *Filaments* green, jointed, very gelatinous. *Ramuli* penicellate, fascicled. *Fructification* a granular mass in the articulations of the main filaments.—P. 321.

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.

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.* Cænothalami.

Sect. I. *Apothecia included in wart-like processes formed from the substance of the plant.* Phymatoidei.

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.* Discoidei.

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

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 inflexed, 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. 340.

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. 341.

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, uniform or wanting). *Apothecia* on *podetia*, orbicular immarginate, at length capituliform, bearing thick coloured masses of fructification.—P. 342.

428. Bœomyces. *Plant* crustaceous, spreading, plane, adnate. *Apothecia* on short, soft, solid, simple *podetia*, capituliform, solid, immarginate, coloured, convex, reflexed at the margin.—P. 346.

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.*

431. Sphærophoron. *Plant* cartilaginous, fibrous within, nearly solid, shrubby, branched. *Apothecia* sessile, terminal, subglobose, bursting irregularly, and containing a black, globular, pulverulent mass.—P. 347.

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.

433. Ramalina. *Plant* cartilaginous, fibrous and nearly solid within, branched, somewhat shrubby, mostly sorediferous. *Apothecia* shield-like, thick, subpedicellate and subpeltate, plane, bordered, wholly formed from the substance of 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.

435. Usnea. *Plant* much branched, filiform, mostly pendulous, furnished within with a bundle of elastic fibres. *Apothecia* orbicular, terminal, peltate, often ciliate at the border.—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.

437. Lepraria. Whole plant crustaceo-pulverulent, spreading, adnate, uniform. *Apothecia* unknown.—P. 351.

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.

439. VERRUCARIA. *Receptacle* crustaceous, thin, adnate. *Perithecia* globoso-hemispherical, somewhat immersed, furnished with a minute prominent orifice.—P. 353.

440. PORINA. *Receptacle* cartilaginous, olivaceous or greyish, adnate, tuberculated. *Spherules* immersed in the tubercles, with pore-like orifices.—P. 354.

DIV. II. *Plants destitute of a crust. Sporuliferous mass evident, mostly escaping spontaneously.* PSEUDO-FUNGI, *De Cand.*, rather PSEUDO-GASTROMYCI.

* *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. STROMATOSPHÆRIA. *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. CRYPTOSPHÆRIA. *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.

447. POLYSTIGMA. *Receptacle* thin, subcarnose, (orange), epiphyllous, the surface dotted. *Spherules* immersed, very minute.—P. 365.

448. Næmaspora. *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 Stromatosphæria.—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 lamellæ, 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 lamellæ.* 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 sinuous: either irregular sinuosities of the same substance as the pileus, or anastomosing lamellæ, forming elongated and very flexuose pores.*

458. Dædalea. *Hymenium* sinuous, composed of anastomosing 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. *Hymenium* composed of dentate, interrupted lamellæ—P. 405.

Div. VI. *Plants stipitate, sessile or resupinate. Hymenium 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 expanded, warty or papillose, smooth or minutely hairy surface.*

463. Thelephora. *Plant*, with very few exceptions, more or less adnate, thin, coriaceous, very rarely infundibuliform. *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 branched. *Hymenium* smooth, occupying almost the whole surface, confluent with the stipes.—P. 412.

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

467. Geoglossum. *Hymenium* short, club-shaped, mostly compressed, stipitate. *Stipes* elongate, smooth or hairy. *Plants* black or dull green.—P. 416.

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

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.

473. Ascobolus. *Pileus* carnose, cup-shaped or hemispherical. *Sporuliferous* cells in the disk forming prominent points, filled with a fluid intermixed with the 8 sporules.—P. 426.

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.

476. UREDO. *Epidermis* of the leaf forming a pseudo-peridium. *Sporidia* 1-celled, free, mostly globose.—P. 434.

477. ÆCIDIUM. *Peridium* membranaceous, bursting through the epidermis, and dehiscent at the apex, with a dentate or lacerate orifice. *Sporidia* free.—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. STILBUM. 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. *Peridia* flocciform, subdiaphanous, various, subsimple, aggregato-cæspitose, parasitic on living leaves. *Sporules* sometimes, but rarely, evident.—P. 449.

483. LICEA. *Peridium* membranaceous, sessile, fragile, enclosing a pulverulent mass of sporules, unmixed with filaments. (No subjacent membrane).—P. 451.

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.*

484. Spumaria. *Form* irregular, roundish, effused. *Peridium* soft, at length membranaceous, fragile. *Sporules* contained in the folds of branched, elongated, membranaceous, persistent processes.—P. 452.

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.

489. Physarum. *Sporangium* minute, mostly stipitate, subglobose. *Peridium* single, membranaceous, bursting and deciduous in distinct portions. *Sporules* mixed with a mass of filaments.—P. 453.

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

491. Leangium. Minute, subglobose. *Peridium* single, membranaceous, bursting into subregular, persistent, expanding segments. *Filaments* attached at the base, and surrounding a *columella*.—P. 455.

492. Arcyria. 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.

494. Craterium. *Peridium* oblong, stipitate, operculate, containing a cellulose, filamentous, sporuliferous mass.—P. 456.

** *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.*

502. Fusidium. *Thallus* plane, effused. *Filaments* short, branched. *Sporidia* fusiform, scattered.—P. 464.

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.

505. Trichothecium. *Filaments* minute, branched, forming a tufted thallus. *Sporidia* scattered, subglobose, didymous.—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.

513. Acremonium. *Thallus* composed of decumbent, entangled, branched, pellucid filaments. *Sporidia* globose, solitary, pedicellate.—P. 468.

514. CLADOSPORIUM. *Thallus* composed of erect, rigid, subopake, jointed, simple or branched, aggregate filaments. *Sporules* ovate, attached in a series to the filaments, deciduous.—P. 469.

DIV. III. *Filaments beaded.*

515. ACROSPORIUM. *Thallus* composed of minute, tufted, pellucid, 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 filaments.—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. EPIPHYTÆ.

CHAR.—Very simple plants, composed merely of aggregated, naked sporidia, or of sporidia mingled with a minute, pulverulent mass.

* *Plants naked, on the surface of living leaves.*

520. CYLINDROSPORIUM. 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.

(*Nat. Ord.* Chenopodeæ, *Hook.* Scot. 2. p. 209.)

1. S. *herbacea*, stem herbaceous, mostly erect, compressed, and somewhat thickened upwards between each articulation, notched; spikes cylindrical, slightly tapering at the extremity. *Lightf.* p. 69. *Smith*, Fl. Brit. p. 2. *Hook.* Fl. Scot. p. 1. *S. annua.* E. B. t. 415. et *S. procumbens*, t. 2475.

Hab. Sea coast. Aberlady Bay, Dr Parsons, in Lightfoot. Inverkeithing Bay, Mr Neill. Morison's Haven, Dr Graham and Mr D. Steuart. September. ⊙.

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.

(*Nat. Ord.* Halorageæ, *Hook.* Scot. 2. p. 257.)

1. H. *vulgaris*, leaves whorled linear. *Lightf.* p. 70. *Smith*, Fl. Brit. p. 4. *Hook.* Fl. Scot. p. 2. E. B. t. 763.

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

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.

II. DIANDRIA.

I. MONOGYNIA.

1. LIGUSTRUM.

(*Nat. Ord.* OLEINEÆ, *Hook.* Scot. 2. p. 229.)

1. L. *vulgare*, leaves elliptico-lanceolate, somewhat acute; panicle compact. *Lightf.* p. 72. *Smith*, Fl. Brit. p. 12. *Hook.* Fl. Scot. p. 3. E. B. t. 764.

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.

(*Nat. Ord.* OLEINEÆ, *Hook.* Scot. 2. p. 229.)

1. F. *excelsior*, leaflets serrate, lanceolate, flowers destitute of a perianth. *Lightf.* p. 641. *Smith*, Fl. Brit. p. 12. *Hook.* Fl. Scot. p. 3. E. B. t. 1692.

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.

(*Nat. Ord.* ONAGRARIÆ, *Hook.* Scot. 2. p. 258.)

1. C. *Lutetiana*, stem erect, leaves ovato-cordate, toothed, downy. *Lightf.* p. 80. *Smith*, Fl. Brit. p. 13. *Hook.* Fl. Scot. p. 4. E. B. t. 1056.

β. *alpina*, leaves cordate, shining, glabrous. C. alpina, *Lightf.* p. 80. *Smith*, Fl. Brit. p. 14. *Hook.* Fl. Scot. p. 4. E. B. t. 1057.

HAB. Woods and brakes. Newbattle woods, Dr Graham. Rosslyn and Auchindenny woods. Granton woods. Corstorphine Hill. β. On the west side of Arthur's Seat, Mr Neill.

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 *Fl. Dan.* (t. 256.) is abundant in the highland woods, and is exactly intermediate in specific character, though often larger than C. *lutetiana* in every part, and with delicate large leaves. I have also received this variety from Canada, through the kindness of Dr Holmes of Montreal. In Engl. Bot. the figures are very inaccurate, and at variance with the descriptions. I have never seen C. *intermedia* of Ehrhart, but suspect it is also nothing more than a variety. Another remarkable variety 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. *lutetiana*, the leaves are very small, almost quite entire, and hirsute.

4. VERONICA.

(*Nat. Ord.* SCROPHULARINÆ, *Hook.* Scot. 2. p. 220.)

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

1. V. *serpyllifolia*, flowers in a spike; leaves ovate, slightly crenate; capsule obcordate. *Lightf.* p. 73. *Smith*, Fl. Brit. p. 19. *Hook.* Fl. Scot. p. 4. E. B. t. 1075.

HAB. Road-sides, pastures, neglected gardens, &c. Not unfrequent about Edinburgh. King's Park, Dr Graham. June, July. ♃.

Thyme-leaved or *Smooth Speedwell.*—Stems procumbent, radicating, 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 bracteæ. *Flowers* small, pale blue.

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

2. V. *scutellata*, racemes alternate, pedicels divaricate; leaves linear dentato-serrate. *Lightf.* p. 74. *Smith*, Fl. Brit. p. 21. *Hook.* Fl. Scot. p. 5. E. B. t. 782.

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; stem erect. *Lightf.* p. 73. *Smith*, Fl. Brit. p. 20. *Hook.* Fl. Scot. p. 6. E. B. t. 781.

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. ♃.

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

4. V. *Beccabunga*, racemes opposite; leaves elliptical, obtuse, subserrate; stem procumbent. *Lightf.* p. 72. *Smith*, Fl. Brit. p. 20. *Hook.* Fl. Scot. p. 6. E. B. t. 655.

HAB. Ditches and streams, extremely common. June—August. ♃.

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.

5. V. *officinalis*, flowers in spikes; leaves ovate, shortly petiolate, rough, pubescent, stem procumbent, very pubescent. *Lightf.* p. 72. *Smith*, Fl. Brit. p. 16. *Hook.* Fl. Scot. p. 6. E. B. t. 765.

HAB. Pastures, hedgebanks, woods very common. King's Park. Bank at the east end of Duddingston Loch. June—July. ♃.

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

6. V. *montana*, racemes few-flowered: leaves cordato-ovate, petiolate, serrate; stem hairy on all sides. *Lightf.* p. 74. *Smith*, Fl. Brit. p. 21. *Hook.* Fl. Scot. p. 6. E. B. t. 766.

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."

7. V. *Chamædrys*, flowers spiked, at length racemed; leaves broadly ovate, sessile, inciso-serrate; hairs on the stem forming two opposite longitudinal lines. *Lightf.* p. 74. *Smith*, Fl. Brit. p. 22. *Hook.* Fl. Scot. p. 7. E. B. t. 623.

HAB. Woods, hedgebanks, pastures, very abundant. May, June. ♃.

Germander 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 whitish. *Capsule* shorter than the calyx.

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

8. V. *agrestis*, leaves shortly petiolate, cordato-ovate, deeply serrate; segments of the calyx ovato-lanceolate; stem procumbent. *Lightf.* p. 75. *Smith*, Fl. Brit. p. 23. *Hook.* Fl. Scot. p. 7. E. B. t. 783.

HAB. Fields, waste places, neglected gardens. Extremely common. April to September. ☉.

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.

9. V. *arvensis*, leaves ovate, deeply serrate, floral ones lanceolate; segments of the calyx lanceolate; stem nearly erect. *Lightf.* p. 75. *Smith*, Fl. Brit. p. 24. *Hook.* Fl. Scot. p. 7. E. B. t. 734.

HAB. Fields, waste places, and on wall-tops. Extremely common on the walls by the road-sides on every side of Edinburgh. April to July. ☉.

Wall Speedwell.—Stem 3–6 inches high, somewhat branched at the base, but the central stem almost always the tallest, and most erect. *Leaves* opposite, hairy, the lowest on short petiols. *Flowers* nearly sessile, very small, pale blue. Segments of the *Calyx* lanceolate. *Capsule* compressed and ciliated.

10. V. *hederifolia*, leaves cordato-ovate, mostly 5-lobed, petiolate; segments of the calyx cordate, ciliated; stem procumbent. *Lightf.* p. 76. *Smith*, Fl. Brit. p. 24. *Hook.* Fl. Scot. p. 7. E. B. t. 784.

HAB. Fields, hedgebanks, and road sides, very common. Fields about Merchiston Castle and Craiglockhart, abundant. April to August. ☉.

Ivy-leaved Speedwell.—Stems 6–15 inches long, weak, unbranched. *Leaves* roundish, cordate, mostly 5-lobed, but rather irregular, the middle lobe by much the largest, flat, all petiolate, slightly hairy. *Flower-stalks* somewhat longer than the leaves, recurved when in fruit. *Flowers* pale blue, small. Segments of the *Calyx* heart-shaped. *Capsule* 2-lobed, turgid. *Seeds* large, 2 in each cell.

5. PINGUICULA.

(*Nat. Ord.* LENTIBULARIÆ, *Hook.* Scot. 2. p. 213.)

1. P. *vulgaris*, spur cylindrical-acute, as long as the veinless petal, upper lip 2-lobed, lower one in three unequal obtuse segments, (Hook). *Lightf.* p. 76. *Smith*, Fl. Brit. p. 27. *Hook.* Fl. Scot. p. 8. E. B. t. 70.

HAB. Bogs and marshy meadows. Hunter's Bog in the King's Park. Pentland Hills. June. ♃.

Common Butterwort.—Plant about 5 inches high, "covered with minute crystalline raised points," (*Hook*). *Leaves* radical, ovate, obtuse, fleshy, with the margin involute, pale green, remarkably unctuous on the upper surface. *Scape* single-flowered. *Flower* drooping, purple, with a hairy palate. *Capsule* ovate, 1-celled.

6. UTRICULARIA.

(*Nat. Ord.* LENTIBULARIÆ, *Hook.* Scot. 2. p. 212.)

1. U. *vulgaris*, spur of the corolla conical, upper lip as long as the projecting palate; margin of the leaves bristly. *Lightf.* p. 77. *Smith*, Fl. Brit. p. 28. *Hook.* Fl. Scot. p. 8. E. B. t. 253.

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

Greater-hooded 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.

2. U. *minor*, spur very short and obtuse, keeled; upper lip of the corolla as long as the palate. *Lightf.* p. 78. *Smith*, Fl. Brit. p. 28. *Hook.* Fl. Scot. p. 9. E. B. t. 254.

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

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 tripartite, linear, dichotomous, smooth. *Flowers* pale yellow, few, the upper *lip* not closing the palate.

7. SALVIA.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 214.)

1. S. *verbenaca*, leaves serrate, sinuate, rugose; corolla narrower than the calyx. *Lightf.* p. 79. *Smith*, Fl. Brit. p. 31. *Hook.* Fl. Scot. p. 10. E. B. t. 154.

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. ♃.

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, ringent. *Upper lip* concave-compressed. *Lower lip* 3-lobed, the middle one the largest.

8. LEMNA.

(*Nat. Ord.* AROIDEÆ, *Hook.* Scot. 2. p. 191.)

1. L. *trisulca*, fronds thin elliptico-lanceolate, caudate at one extremity, at the other serrate; roots solitary. *Lightf.* p. 537. *Smith*, Fl. Brit. p. 956. *Hook.* Fl. Scot. p. 10. et Fl. Lond. *new series*, p. 119. E. B. t. 926.

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

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 proliferous, 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.

2. L. *minor*, fronds nearly ovate, compressed; roots solitary. *Lightf.* p. 537. *Smith*, Fl. Brit. p. 957. *Hook.* Fl. Scot. p. 11. et Fl. Lond. new series, t. 120. E. B. t. 1095.

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

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 *gemmæ* (the young fronds),

so as often to completely cover the surface of stagnant water. *Flower* resembling that of the preceding species.

3. L. *gibba*, fronds broadly ovate, almost plane above, hemispherical, and pale beneath; roots solitary. *Hook.* Fl. Scot. p. 11. *Smith*, Fl. Brit. p. 957. E. B. t. 1233.

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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 162.)

1. A. *odoratum*, panicle spiked, oblong, flowers upon short footstalks, and longer than the awn. *Lightf.* p. 81. *Smith*, Fl. Brit. p. 31. *Hook.* Fl. Scot. p. 11. E. B. t. 647.

HAB. Meadows and pastures. Common. May, June. ♃.

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.

(*Nat. Ord.* VALERIANEÆ, *Hook.* Scot. 2. p. 245.)

* *Corolla with* 1 *stamen.*

1. V. *rubra*, leaves ovato-lanceolate; flowers with a spur. *Hook.* Fl. Scot. p. 14. *Smith*, Fl. Brit. p. 37. E. B. t. 1531.

HAB. Old walls, buildings, and waste places. Old walls at Inverleith, Mr E. Maughan. July, August. ♃.

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,

nearly uniform. *Lightf.* p. 85. *Smith*, Fl. Brit. p. 38. *Hook.* Fl. Scot. p. 15. E. B. t. 698.

HAB. Banks of streams, moist meadows, and waste places. Near St Bernard's Well, and Figget Whins, Mr Neill. Salisbury Craigs, on the debris facing St Leonard's Hill. June, July. ♃.

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*.

3. V. *pyrenaica*, leaves large, cordate, petiolate; the upper ones with about two pair of small leaflets. *Hook.* Fl. Scot. p. 15. E. B. t. 1591.

HAB. Woods. Collington Woods, G. Don. Abercorn woods, Maughan. July. ♃.

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.

4. V. *dioica*, flowers dicœcious; radical leaves simple ovate, cauline ones pinnatifid. *Lightf.* p. 85. *Smith*, Fl. Brit. p. 37. *Hook.* Fl. Scot. p. 15. E. B. 628.

HAB. Bogs and moist meadows, not common near Edinburgh. Bogs to the westward of Borthwick, Neill. Maughan. Linlithgow, Miss Baird. Pentland Hills, near Currie, Messrs Arnott and Greville. June, July. ♃.

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.

(*Nat. Ord.* VALERIANEÆ, *Hook.* Scot. 2. p. 246.)

1. F. *olitoria*, "fruit tridentate, ovato-rotundate, inflated, glabrous; flowers capitate." *Hook.* Fl. Scot. p. 15. *Valeriana Locusta*, *Lightf.* p. 85. *Smith*, Fl. Brit. p. 39. E. B. t. 811.

HAB. Cornfields. Frequent about Edinburgh. May to July. ☉.

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* spathulate. *Flowers* pale blue, in small dense, terminal heads, with an involucre beneath, of oblong bracteas.

2. F. *dentata*, "fruit sub-tridentate, obpyriform, glabrous, flowers corymbose, with a single flower between the upper divisions of the stems." *Hook.* Fl. Scot. p. 15. *Val. dentata.* E. B. t. 1370.

HAB. Cornfields, especially in a sandy soil. Near Crossgate toll, 3 miles south of Musselburgh, Maughan. Water of Leith, and near Kirkaldy, Mr S. Stewart. Fields between Newhaven and Caroline Park, and elsewhere. June, July. ☉.

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 corymbs, with the bracteas 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. 186.)

1. I. *Pseudacorus*, perianth beardless, the narrow segments smaller than the stigma; leaves sword-shaped. *Lightf.* p. 86. *Smith*, Fl. Brit. p. 41. *Hook.* Fl. Scot. p. 16. E. B. t. 578.

HAB. Ditches, pond-sides and marshy places. Rosslyn woods, by the river side, midway to Lasswade. South end of Lochend. Duddingston Loch. July. ♃.

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. SCHŒNUS.

(*Nat. Ord.* CYPERACEÆ, *Hook.* Scot. 2. p. 173.)

1. S. *nigricans*, culm naked, rounded; flowers in a capitate cluster; involucre 2-leaved, outer one subulate, longer than the flowers. *Lightf.* p. 86. *Smith*, Fl. Brit. p. 43. *Hook*, Fl. Scot. p. 16. E. B. t. 1121.

HAB. Boggy moors. Bog near the sea-shore east of Anstruther, Dr Graham. June, July. ♃.

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.

2. S. *compressus*, culm naked, roundish; spike distichous, shorter than the single involucre; spikelets many-flowered; leaves plane. *Lightf.* p. 87. *Smith*, Fl. Brit. p. 44. *Hook.* Fl. Scot. p. 16. E. B. t. 791.

HAB. Bogs, rare. Near Borthwick Castle, Maughan. June, July. ♃.

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

taceous, channelled. *Hook*, Fl Scot. p. 17. *Smith*, Fl. Brit. p. 45. E. B. t. 1010. *S. ferrugineus*, *Lightf.* p. 86. *S. compressus. var. Lightf.* loc. cit. et t. 24.

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. Somewhat resembling the last species, but attention to the above characters will resolve every difficulty.

5. SCIRPUS.

(*Nat. Ord.* CYPERACEÆ, *Hook.* Scot. 2. p. 173.)

* *Spikes solitary.*

† *Culms simple.*

1. Sc. *cæspitosus*, culm rounded, striated, sheathing at the base; two outer glumes foliaceous at the apex, as long as the spike; stigmas three. *Lightf.* p. 87. *Smith*, Fl. Brit. p. 49. *Hook.* Fl. Scot. p. 17. E. B. t. 1029.

HAB. Bogs and moors, very common. King's Park. Braid Hill. Pentland Hills. Ravelrig-toll Moss, &c. July. ♃.

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.

2. Sc. *pauciflorus*, culm round, sheathed at the base; spike ovate, few-flowered, outer glumes the largest, but shorter than the spike; stigmas three. *Lightf.* p. 87. *Smith*, Fl. Brit. p. 50. *Hook.* Fl. Scot. p. 17. E. B. t. 1122.

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. cæspitosus*, 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.

3. Sc. *palustris* *, culm naked, round, with leafless sheaths at the base; spike naked, oblongo-ovate; stigmas two. *Lightf.* p. 87. *Smith*, Fl. Brit. p. 48. *Hook.* Fl. Scot. p. 18. E. B. t. 131.

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* This and Sc. *acicularis* belong to the genus *Eleocharis* of Mr Brown. Kunth unites it to the *Scirpus* of Mr Brown, with the character "Spiculæ multifloræ. Glumæ undique imbricatæ, vix nullæ vacuæ. Semen lenticulare aut triquetrum. Setæ plerumque sex." As the subject is not decided, it is better in a local Flora to continue them as original *Scirpi*.

β *minor*, smaller, spikes fewer-flowered, glumes deeper brown. *Hook.* Fl. Scot. p. 18. Sc. *multicaulis*, *Smith*, Fl. Brit. p. 48. E. B. t. 1187.

HAB. Ditches, marshes, sides of streams, common. Lochend and Duddingston Loch. Braid Hill. Pentland Hills. β Pentland Hills, G. Don. July, August. ♃.

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.

4. Sc. *acicularis*, culm grooved, closely sheathed at the base; spike small ovate, acute, naked; glumes acuminate; stigmas three. *Lightf.* p. 88. *Smith*, Fl. Brit. p. 51. *Hook.* Fl. Scot. p. 18. E. B. t. 749.

HAB. Marshes and the sandy sides of Lakes, rare. About a mile NW. from Lasswade, Dr Parsons in Lightfoot. July, August. ♃.

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 sphærical base of the style." *Hook.*

†† *Culms branched.*

Sc. *fluitans*, culm rounded, weak, furnished with sheathing leaves; stigmas two. *Lightf.* p. 88. *Smith*, Fl. Brit. p. 51. *Hook.* Fl. Scot. p. 18. E. B. t. 216. *Isolepis fluitans*, *Br.* Prod *.

HAB. Ditches and shallow pools. Ravelrig-toll moss, Messrs Arnott and Greville. Braid Hill marshes, G. Don. Marsh on Dunearn Hill, Mr Neill. July, August. ♃.

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.*

6. Sc. *lacustris*, upper sheaths leafy; panicle terminal, twice compound; involucre 2-leaved; spikelets ovate. *Lightf.* p. 88. *Smith*, Fl. Brit. p. 52. *Hook.* Fl. Scot. p. 18. E. B. t. 666.

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* In this genus of Mr Brown, there are no bristles accompanying the fruit. M. Kunth, however, has united Isolepis with *Fimbristylin* and *Echinolytrum*, 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*.

HAB. Sides of streams and ponds. Marsh and old willow grounds, halfway between Duddingston and Portobello, Mr Macnab. Lochend, Mr Neill. July. ♃.

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 various in length, the longest often reaching a little above the panicle, but often much shorter; beneath the clusters of spikelets are also small involucres, 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, matts, &c.

7. Sc. *setaceus*, culms setaceous, terminating in a single involucre; spikelets two. *Lightf.* p. 88. *Smith*, Fl. Brit. p. 54. *Hook.* Fl. Scot. p. 19. E. B. t. 1693.

HAB. Moist gravelly places, rare. King's Park, G. Don. By the reservoir on the Pentland Hills. July, August. ☉.

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

†† *Culms triangular.*

8. Sc. *maritimus*, culm leafy; spikelets sessile and pedunculate, in a terminal cluster; involucres many, foliaceous; glumes notched, mucronate. *Lightf.* p. 89. *Smith*, Fl. Brit. p. 56. *Hook.* Fl. Scot. p. 19. E. B. t. 542.

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 compound cyme, furnished with an involucre of several foliaceous leaflets; glume entire. *Lightf.* p. 89. *Smith*, Fl. Brit. p. 57. *Hook.* Fl. Scot. p. 19. E. B. t. 919.

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. *Involucre*, 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 clustered. *Glumes* ovate, greenish. *Stigmas* 3. *Fruit* roundish, surrounded by 6–8 bristles.

6. ERIOPHORUM.

(*Nat. Ord.* CYPERACEÆ, *Hook.* Scot. 2. p. 172.)

* *Spike solitary.*

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

permost sheath leafless, obtuse; spike ovate. *Lightf.* p. 20. *Smith*, Fl. Brit. p. 58. *Hook.* Fl. Scot. p. 20. E. B. t. 873.

HAB. Bogs, moors and heaths. Pentland Hills. Dalmahoy Hill, and the moss at its base, Maughan. Very abundant on the Pentlands near Currie, and west of Habbie's How. April to June ♃.

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.*

2. E. *angustifolium*, culms indistinctly triangular; leaves linear grooved triangular at the end; involucre longer than the flowering spikes. *Hook.* Fl. Scot. p. 21. *Smith*, Fl. Brit. p. 59. E. B. t. 564. *E. polystachion*, *Lightf.* p. 89.

HAB. Moors. Pentland Hills. May, June. ♃.

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.

3. E. *polystachion*, culms obtusely triangular; leaves linear, plane; involucre longer than the flowering spikes; spikes drooping when in fruit. *Hook.* Fl. Scot. p. 21. *Smith*, Fl. Brit. p. 59. E. B. t. 563.

HAB. Moors and bogs. Pentland Hills, G. Don. May, June. ♃.

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.* GRAMINEÆ, *Hook.* Scot. 2. p. 163.)

1. N. *stricta*, spike erect, slender, the florets all pointing one way. *Lightf.* p. 90. *Smith*, Fl. Brit. p. 61. *Hook.* Fl. Scot. p. 21. E. B. t. 290.

HAB. Moors and heaths, excessively common. On some parts of the Pentland Hills it forms the principal turf. June, July. ♃.

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.)

1. A. *pratensis*, culm erect, glabrous; spike cylindrical, obtuse; glumes of the calyx connate at the base, hairy; "awn twice the length of the corolla." *Lightf.* p. 9. *Smith*, Fl. Brit. p. 72. *Hook.* Fl. Scot. p. 22. E. B. t. 759.

HAB. Meadows and pastures, very common. May to July. ♃.

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.

2. A. *geniculatus*, culm ascending, bent at the joints; spike cylindrical, obtuse; glumes of the calyx very obtuse; awn twice as long as the corolla. *Lightf.* p. 92. *Smith.* Fl. Brit. p. 74. *Hook.* Fl. Scot. p. 22. E. B. t. 1250.

HAB. Ditches, wet meadows, and marshes, very common. King's Park by the ditch facing Sampson's Ribs. June, July. ♃.

Floating Foxtail-grass.—*Culms* 12–18 inches long, floating or prostrate on the wet soil, radicating at the joints, and ascending towards the ends, branched, smooth. *Leaves* short, rather broad, nearly smooth, the uppermost one with a tumid sheath. *Stipules* white and delicate, oblong. *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. *Anthers* yellow, and, if Dr Hooker is correct in thinking *A. fulvus* (E. B. t. 1467.) the same species, they are also brown. Host and Gaudin describe them as such in *A. geniculatus*.

9. PHALARIS.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 163.)

1. Ph. *canariensis*, panicle forming an obtuse spike; calycine glumes boat-shaped, entire at the point; corolla of four valves. *Hook.* Fl. Scot. p. 23. *Smith*, Fl. Brit. p. 62. E. B. t. 1310.

HAB. Waste places. Certainly not indigenous, but sometimes met with about Edinburgh; of course in no fixed station. June, July. ☉.

Manured 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 increases towards the apex, when it becomes rather suddenly acuminated. *Ext. 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.

2. Ph. *arundinacea*, "panicle erect, branches patent; florets clustered, secund; *ext.* corolla of two very minute hairy valves," *Hook.* Fl. Scot. p. 23. *Lightf.* p. 90. E. B. t. 402. and t. 2160. f. 2. *Arundo colorata*, *Smith*, Fl. Brit. p. 147.

HAB. Sides of lakes and streams. Duddingston Loch. July, August. ♃.

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 secund clusters, mostly tinged with pink or purple. *Calycine glumes* lanceolate. *Int. glumes* nearly as long as the calyx, unequal and lanceolate.

10. PHLEUM.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 164.)

1. P. *pratense*, spike long, cylindrical; calycine glumes truncate, ciliated at the back; awn shorter than the glumes. *Lightf.* p. 91. *Smith*, Fl. Brit. p. 68. *Hook.* Fl. Scot. p. 23. E. B. t. 1076.

HAB. Meadows and pastures, common. June, July. ♃.

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. *Calycine 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 *Phl. nodosum* of *Linn.*?

2. P. *arenarium*, spike oblongo-ovate; calycine glumes acutely lanceolate, ciliated at the back. *Lightf.* p. 1080. *Hook.* Fl. Scot. p. 24. *Phalaris arenaria*, *Smith*, Fl. Brit. p. 62. E. B. t. 222.

HAB. Sandy banks on the sea-shore. Near Prestonpans, Mr Neill. Near Burntisland, Mr Arnott. Between Pettycur and Kirkaldy. Rare near Edinburgh on the south side of the Frith. July. ☉.

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 striæ.

11. MILIUM.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 164.)

1. M. *effusum*, flowers loosely panicled, awnless. *Lightf.* p. 92. *Smith*, Fl. Brit. p. 75. *Hook.* Fl. Scot. p. 24. E. B. t. 1106.

HAB. Moist woods. Newbattle woods, abundant, Dr Graham. Rosslyn woods, Messrs Arnott and Greville. June. ♃.

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.

12. AGROSTIS.

(*Nat Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 164.)

* *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. ♃.

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. ♃.

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).*

3. Ag. *vulgaris*, branchlets of the panicle diverging; calycine valves equal; outer valve of the corolla 3-nerved, twice as long as the inner bifid one; stipule short, obtuse. *Lightf.* p. 93. *Smith*, Fl. Brit. p. 79. *Hook.* Fl. Scot. p. 25. E. B. t. 1671.

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

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

HAB. Meadows, pastures, moors, common. β. Pentland Hills, Maughan. γ. Pentland Hills, Lightfoot. Burntsfield Links and N. Queensferry, Neill. June, July. ♃.

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 scariose margin, ovato-lanceolate, smooth, rough at the back. *Corolla* of two unequal membranaceous greenish-white valves, the *inner one* 2-nerved, with a bifid 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.

4. Ag. *alba*, branches of the panicle hispid; branchlets patent; outer valve of the corolla 5-nerved; ligule oblong. *Hook.* Fl. Scot. p. 25. *Smith*, Fl. Brit. p. 81. *Lightf.* p. 93. E. B. t. 1189. *Schrad.* Germ. p. 209. *Ag. stolonifera*, *Lightf.* p. 93. *Smith*, Fl. Brit. p. 80. E. B. t. 1532.

HAB. Fields and road-sides. Braid Hill, G. Don. About Edinburgh, Mr Neill. Near Newhaven. July. ♃.

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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 164.)

1. A. *arenaria*, calyx one-flowered; panicle spiked; leaves involute, pungent. *Lightf.* p. 107. *Smith*, Fl. Brit. p. 148. *Hook.* Fl. Scot. p. 27. E. B. t. 107.

HAB. Sandy banks on the sea-shore. Between Caroline Park and Cramond. Between Burntisland and Pettycur. Portobello and Musselburgh. July. ♃.

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.

2. A. *Phragmites*, calyx containing about five florets; panicle very lax. *Lightf.* p. 106. *Smith*, Fl. Brit. p. 144. *Hook.* Fl. Scot. p. 27. E. B t. 401.

HAB. Sides of streams and ponds, abundant. Lochend and Duddingston Loch. July. ♃.

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,

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.

14. HOLCUS.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 165.)

1. H. *avenaceus*, calycine glumes unequal; perfect floret superior, imperfect one with a long jointed awn; root knotted. *Smith*, Fl. Brit. p. 90. *Hook.* Fl. Scot. p. 28. E. B. t. 813. *Avena elatior*, *Lightf.* p. 105.

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 nerved, striated and ciliated at the back.—Plant with the habit of an *Avena*.

2. H. *mollis*, calycine glumes subequal; perfect floret inferior and awnless, imperfect one with a bent awn, reaching beyond the calyx; root creeping. *Lightf.* p. 631. *Smith*, Fl. Brit. p. 89. *Hook.* Fl. Scot. p. 28. E. B. t. 1170.

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 *corollas*, and inclosing them. "Both florets often destitute of pistil;" *Hook.* Principally distinguished from the following by the protruded awn and creeping roots.

3. H. *lanatus*, calycine glumes equal; perfect floret inferior and awnless, imperfect one with a curved awn not protruded; root fibrous. *Lightf.* p. 631. *Smith*, Fl. Brit. p. 89. *Hook.* Fl. Scot. p. 28. E. B. t. 1169.

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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 166.)

* *Corolla awnless.*

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

leaves hairy. *Hook.* Fl. Scot. p. 29. *Smith*, Fl. Brit. p. 83. E. B. t. 648. *Poa cristata*, *Lightf.* p. 98.

HAB. Mountainous pastures and rocky places. Calton Hill, Dr Graham. Summit of Corstorphine Hill. Debris of Salisbury Craigs, Mr Neill. June, July. ♃.

Crested Hair-grass.—Plant tufted. *Culms* 6–8 inches high, simple, erect, foliaceous towards the base, smooth. *Leaves* linear, smooth, short, rather rigid. *Panicle* densely spiked, shining, oblong, sometimes acute. *Spikelets* ovato-lanceolate. *Calyx-glumes* unequal, slightly downy, lanceolate, acute, nerved and with a roughish keel, containing 2–3 flowers. *Inner valves* of the *corolla* white, membranaceous.

2. A. *aquatica*, panicle spreading; glumes all obtuse; florets longer than the calyx; leaves plane. *Lightf.* p. 94. *Smith*, Fl. Brit. p. 84. *Hook.* Fl. Scot. p. 29. E. B. t. 1557.

HAB. Ditches and pond sides, rather rare. Ditches in the Meadows, Edinburgh; especially in that on the east side of the centre walk. Ditch on the west side of Lochend, and at the margin of the Loch itself. June. ♃.

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 pleasant 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. *Calycine 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.*

3. A. *cæspitosa*, "panicle diffuse, branches scabrous; florets villous at the base, rather longer than the calyx, the awn straight, inserted near the base of, and not exceeding, the corolla; leaves plane." *Hook.* Fl. Scot. p. 29. *Lightf.* p. 94. *Smith*, Fl. Brit. p. 84. E. B. t. 1453.

HAB. Marshes, moist places, damp woods, very common. July, August. ♃.

Turfy Hair-grass.—Plant forming great tufts, 2–3 feet in circumference. *Culms* 2–4 feet high, sub-erect, leafy, with a long naked 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. *Calycine 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."

Hook. Fl. Scot. p. 30. *Lightf.* p. 95. *Smith*, Fl. Brit. p. 85. E. B. t. 1519.

HAB. Moors, heaths, hilly pastures, common. King's Park. Blackford, Braid, and Pentland Hills, &c. July, August. ♃.

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. *Valves* 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.

5. A. *caryophyllea*, "panicle divaricate; florets scarcely villous at the base, shorter than the calyx, awn inserted below the middle, jointed, longer than the calyx; leaves setaceous." *Hook.* Fl. Scot. p. 30. *Lightf.* p. 95. *Smith*, Fl. Brit. p. 88. E. B. t. 812.

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

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. *Valves* of the *corolla* whitish, scariose, slightly unequal, half the length of the awn.

6. A. *præcox*, panicle somewhat spiked, all the glumes subequal; awn arising from near the base, and longer than the calyx; leaves setaceous. *Lightf.* p. 95. *Smith*, Fl. Brit. p. 87. *Hook.* Fl. Scot. p. 30. E. B. t. 1296.

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

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. *Valves* of the *corolla* narrower, acute, with a bifid apex, the *awn* about half as long again as the valves.

16. MELICA.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 166.)

1. M. *nutans*, panicle racemed; spikelets drooping; calyx containing two flowers. *Hook.* Fl. Scot. p. 31. *Smith*, Fl. Brit. p. 92. E. B. t. 1059. *Mel. nutans var. Lightf.* p. 96.

HAB. Woods, rare. Rosslyn woods by the path-side, plentiful. May, June. ♃.

Nodding or *Mountain Melic-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* secund 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.

2. M. *uniflora*, panicle branched, inclined, few-flowered; spikelets erect, with one perfect floret. *Hook.* Fl. Scot. p. 31. *Smith*, Fl. Brit. p. 91. E. B. t. 1058. *Mel. nutans*, *Lightf.* p. 96.

HAB. Woods, rare. Rosslyn woods, opposite Hawthornden, plentiful. Mr Neill. June, July. ♃.

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. *Calycine glumes* unequal, ovate, rather obtuse, containing a single perfect floret, and the rudiments of at least one more.

3. M. *cærulea*, panicle and its branches erect, subcoarctate; spikelets erect, oblongo-cylindrical. *Lightf.* p. 96. *Smith*, Fl. Brit. p. 93. *Hook.* Fl. Scot. p. 31. E. B. t. 750.

HAB. Moors and heaths, common. Pentland Hills. Ravelrig-toll moss. August. ♃.

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. *Calycine 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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 167.)

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

1. P. *aquatica*, panicle erect, large, very much branched; outer valves of the florets obtuse, 7-ribbed; leaves very broad. *Lightf.* p. 1083. *Smith*, Fl. Brit. p. 95. *Hook.* Fl. Scot. p. 32. E. B. t. 1315.

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.

2. P. *fluitans*, panicle forming a very long, lax spike, suberect; spikelets linear, appressed, 8–12 flowered; root creeping. *Hook.* Fl. Scot. p. 32. *Smith*, Fl. Brit. p. 95. E. B. t. 1520. *Festuca fluitans*, *Lightf.* p. 103.

HAB. Ditches, slow streams, and ponds, very common. King's Park. The Meadows. July, August. ♃.

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.

3. P. *maritima*, panicle straight, subcoarctate; spikelets about 5-flowered, the outer valves of which are 5-nerved, obtuse; leaves involute; root creeping. *Lightf.* p. 98. *Smith*, Fl. Brit. p. 97. *Hook.* Fl. Scot. p. 33. E. B. t. 1140.

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. ♃.

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*.

4. P. *rigida*, panicle very rigid, lanceolate, distichous and secund; spikelets about 7-flowered; florets ribless; root fibrous. *Lightf.* p. 1084. *Smith*, Fl. Brit. p. 99. *Hook.* Fl. Scot. p. 33. E. B. t. 1371.

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 cauline 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.

5. P. *compressa*, panicle slightly secund, coarctate before and after flowering; spikelets linear-oblong, of about 6 web-connected florets; culm compressed; root creeping. *Lightf.* p. 97. *Smith*, Fl. Brit. p. 99. *Hook.* Fl. Scot. p. 34. E. B. t. 365.

Hab. Walls, waste places, pastures. Walls about the King's Park, Maughan. Common about Edinburgh, Mr Arnott. On the walls at St Leonard'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.*

6. P. *trivialis*, panicle spreading, spikelets of three flowers, the outer glumes of which are 5-nerved, and webbed at the base; culms roughish; ligule oblong; root fibrous. *Lightf.* p. 97. *Smith*, Fl. Brit. p. 103. *Hook.* Fl. Scot. p. 35. E. B. t. 1072.

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

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. *Calycine glumes* rough at the back, equal, containing about 3 flowers. *Glumes* of the *corolla* connected by a web.

7. P. *pratensis*, panicle spreading, spikelets of about four flowers, with the outer glumes 5-nerved, webbed at the base; culm smooth; ligule short; root creeping. *Lightf.* p. 97. *Smith*, Fl. Brit. p. 104. *Hook.* Fl. Scot. p. 35. E. B. t. 1073.

β. *minor*, much smaller, subglaucous, panicle fewer-flowered. *Hook.* Fl. Scot. p. 35. *P. subcærulea*, E. B. t. 1004.?

Hab. Meadows and pastures, common. β, On wall-tops, sandy-banks, and hilly pastures. Walls all round Edinburgh. Sea-shore near Kirkcaldy. June, July. ♃.

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. *Calycine valves* somewhat unequal, acute, 3-nerved; those of the *florets* scariose at the margin and apex, the outer ones 5-nerved, all connected at the base by a long villous web.

8. P. *annua*, panicle slightly secund, divaricate; spikelets of about 5 subremote flowers, the outer valves 5-ribbed, webless; culm compressed, root fibrous. *Lightf.* p. 97. *Smith*, Fl. Brit. p. 105. *Hook.* Fl. Scot. p. 35. E. B. t. 1141.

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. *Calycine valves* unequal, ovato-lanceolate, nerved, containing about 5 florets. Keel and base of the *external valves* of the *corolla* hairy.

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

smooth; root slightly creeping. *Lightf.* p. 98. *Smith*, Fl. Brit. p. 106. *Hook.* Fl. Scot. p. 35. E. B. t. 1265.

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. cæsia*, 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.

10. P. *decumbens*, panicle nearly simple, few-flowered; calyx as long as the four-flowered spikelet. *Hook.* Fl. Scot. p. 36. *Smith*, Fl. Brit. p. 107. E. B. t. 792. *Festuca decumbens*, *Lightf.* p. 102.

Hab. Pastures and moorish places. Near Burntisland, Mr Neill. Arthur's Seat, and coast of Fife, Mr Arnott. Braid and Pentland Hills. July. ♃.

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.

(*Nat. Ord.* Gramineæ, *Hook.* Scot. 2. p. 168.)

1. B. *media*, panicle diffuse, tremulous; spikelets broadly ovate, about 7-flowered; calyx shorter than the florets. *Lightf.* p. 99. *Smith*, Fl. Brit. p. 109. *Hook.* Fl. Scot. p. 37. E. B. t. 340.

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 *corollæ* minute.

19. DACTYLIS.

(*Nat. Ord.* Gramineæ, *Hook.* Scot. 2. p. 169.)

1. D. *glomerata*, panicle crowded, secund; leaves plane, scabrous. *Lightf.* p. 99. *Smith*, Fl. Brit. p. 111. *Hook.* Fl. Scot. p. 37. E. B. t. 335.

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-*

nicle 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, ciliated at the keel, and shortly awned. *Internal glume* bifid.—A very coarse grass.

20. CYNOSURUS.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 172.)

1. C. *cristatus*, spike linear, secund; spikelets alternate, with a pectinate involucre; florets shortly awned. *Lightf.* p. 100. *Smith*, Fl. Brit. p. 111. *Hook.* Fl. Scot. p. 37. E. B. t. 316.

HAB. Pastures, very common. July. ♃.

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 lanceolate, 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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 169.)

1. F. *ovina*, "panicle subsecund, subcoarctate; spikelets oblong, of about 4–5 flowers, with short awns; culms square upwards; leaves setaceous." *Hook.* Fl. Scot. p. 38. *Lightf.* p. 101. *Smith*, Fl. Brit. p. 113. E. B. t. 585. *F. cæsia*, E. B. t. 1917.

β. *vivipara*, plant taller, leaves capillary; panicle viviparous. *Hook.* Fl. Scot. p. 38. *F. ovina*, β. *Lightf.* p. 101. *F. vivipara*, E. B. t. 1355.

HAB. Abundant in dry elevated pastures. β. On Arthur's Seat, Mr Bainbridge. June, July. ♃.

Sheep's Fescue-grass.—"Leaves short, often curved, smooth or slightly scabrous, much tufted, and affording excellent feed for sheep. *Ligule* 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.*

2. F. *duriuscula*, "panicle subsecund, subcoarctate; spikelets oblong, of about six flowers, with short awns; stem leaves nearly plane, radical ones subsetaceous;" *Hook.* Fl. Scot. p. 38. *Lightf.* p. 101. *Smith*, Fl. Brit. p. 115. E. B. t. 470.

β. root creeping. *F. glabra*, *Lightf.* p. 1085. *F. rubra*, E. B. t. 2056.

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.

3. F. *bromoides*, panicle erect, secund, racemose; florets much shorter than the awn, monandrous; culm leafy above. *Lightf.* p. 102. *Hook.* Fl. Scot. p. 39. *Smith*, Fl. Brit. p. 117. E. B. t. 1411.

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. ⊙.

Barren Fescue-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*.

4. F. *myurus*, panicle secund, elongate, somewhat drooping, contracted, "flowers shorter than the awn, monandrous; culm leafy in its upper part;" *Hook.* Fl. Scot. p. 39. *Smith*, Fl. Brit. p. 118. E. B. t. 1412.

HAB. Walls and barren places. Near N. Queensferry, on the hill by the read leading to Inverkeithing, Mr Neill. June. ⊙.

Wall Fescue-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.

5. F. *gigantea*, panicle large, branched, spreading, drooping towards one side; spikelets compressed, 3–6-flowered; flowers shorter than the awn; leaves lanceolate ribbed. *Hook.* Fl. Scot. p. 39. *Smith*, Fl. Brit. p. 120. E. B. t. 1820. *Bromus giganteus*, *Lightf.* p. 104.

HAB. Shady woods. Rosslyn woods, Mr Bainbridge. July, August. ♃.

Tall Fescue-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 valves* 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*.

6. F. *loliacea*, spikelets arranged in an elongated, distichous spike; spikelets alternate, linear, sessile, many-flowered. *Hook.* Fl. Scot. p. 40. *Smith*, Fl. Brit. p. 122. E. B. t. 1821.

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. ♃.

Spiked Fescue-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 valves* unequal,

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.

7. F. *pratensis*, panicle nearly erect, branched, spreading; spikelets linear, many-flowered; florets cylindrical, awnless; root fibrous. *Hook.* Fl. Scot. p. 40. *Smith*, Fl. Brit. p. 123. E. B. t. 1592.

HAB. Moist meadows and pastures, common. June, July. ♃.

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. *Calycine-glumes* unequal, acute, keeled, glabrous. *Outer valves* of the *corollæ* acute, the *inner ones* pubescent at the margin.—The branched panicle is alone sufficient to distinguish this from the last.

8. F. *elatior*, panicle large, patent, much branched, somewhat drooping; spikelets ovato-lanceolate, many-flowered; florets subaristate; root creeping. *Lightf.* p. 102. *Smith*, Fl. Brit. p. 124. *Hook.* Fl. Scot. p. 40. E. B. t. 1593.

HAB. Moist meadows. River bank at Rosslyn, Mr Neill. Caroline Park, Mr Arnott. June, July. ♃.

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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 170.

* *Flowers in a spike.*

1. B. *pinnatus*, spikelets linear, erect, sessile, forming a distichous sub-erect spike; florets longer than the awn, not ciliated at the margin. *Smith*, Fl. Brit. p. 137. E. B. t. 730.

HAB. Waste fields and heathy places. Near North Queensferry, Mr Neill. July. ♃.

Spiked Heath Brome-grass.—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. *Calycine-glumes* unequal, ovate-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.

2. Br. *sylvaticus*, spikelets linear, erect, sessile, forming a distichous rather drooping spike; awn longer than the florets. *Hook.* Fl. Scot. p. 40. *Smith*, Fl. Brit. p. 136. E. B. t. 729. *Festuca sylvatica*, *Lightf.* p. 103.

HAB. Woods and hedges, common. Corstorphine Hill. Rosslyn Woods. July. ♃.

Slender Wood Brome-grass.—Culms 1–3 feet high, glabrous, slender, erect. *Leaves* rather broad, spreading, rough, hairy. *Spike* racemed, simple, drooping, 2–6 inches long. *Spikelets* 5–8 alternate, linear, pubescent. *Calycine valves* unequal, acuminate or shortly awned, nerved. *Outer valve* of the corolla nerved, scabrous, acute. *Inner* one truncate.

* * *Flowers in a branched panicle.*

3. B. *secalinus*, panicle spreading; peduncles but little branched; spikelets oblongo-ovate, compressed, of about ten subcylindrical, glabrous, rather remote flowers, longer than the awn. *Hook.* Fl. Scot. p. 41. *Smith*, Fl. Brit. p. 125. E. B. t. 1171.

HAB. Cornfields. Near Rosslyn, Mr Neill. July, August. ☉.

Smooth Rye Brome-grass.—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.

4. Br. *velutinus*, "panicle spreading, peduncles but little branched; spikelets oblongo-lanceolate, compressed, of about 12 cylindrical pubescent subimbricated florets, awns longer than the glume, (at length patent, *Schrad.*)." *Hook.* Fl. Scot. p. 41. *Schrad.* Fl. Germ. p. 349. *Br. secalinus*, *Lightf.* p. 1026. *Br. multiflorus*, *Smith*, Fl. Brit. p. 126. E. B. t. 1884.

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 Brome-grass.—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.

5. Br. *mollis*, panicle erect, branched, close; spikelets subcompressed, imbricated, pubescent; "awn straight, about as long as the glume," (*Hook.*); leaves very downy. *Lightf.* p. 103. *Smith*, Fl. Brit. p. 126. *Hook.* Fl. Scot. p 41. E. B. t. 1078.

HAB. Fields, banks, walls, roadsides. June. ♂.

Soft Brome-grass.—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;

awn as long as the glume; leaves slightly hairy. *Hook.* Fl. Scot. p. 41. *Smith*, Fl. Brit. p. 228. E. B. t. 1079.

HAB. Fields, road-sides. North of Edinburgh, Dr Graham. Caroline Park, Messrs Arnott, and Greville. June, July. ⊙.

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.

7. Br. *erectus*, panicle erect, slightly compound; "spikelets linear-lanceolate, compressed; florets subcylindrical, remote, glabrous, longer than the straight awn; radical leaves very narrow, ciliated." *Hook.* Fl. Scot. p. 42. *Smith*, Fl. Brit. p. 132. E. B. t. 471.

HAB. Fields, banks, waste places. King's Park, Mr G. Anderson. Below Salisbury Craigs. Between Pettycur and Kirkcaldy, frequent. July. ♃.

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, 5–9 flowered; the florets spreading when in flower. *Calycine glumes* acute. *Outer valves* of the *corollæ* nerved, scabrous at the back, and tapering into the very straight awn.—Habit of the whole plant that of a *festuca*.

8. Br. *asper*, panicle branched, drooping; spikelets linear-lanceolate, compressed; florets remote, hairy, longer than the straight awn; leaves uniform, the lower ones hairy. *Hook.* Fl. Scot. p. 42. *Smith*, Fl. Brit. p. 133. E. B. t. 1172. Br. *racemosus*, *Lightf.* p. 1087.

HAB. Moist woods. Rosslyn Woods, Mr Neill and Mr Bainbridge. June, July. ♂ ?

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.

9. Br. *sterilis*, panicle drooping, scarcely branched; spikelets linear-lanceolate on long peduncles; florets rather remote, shorter than the straight awn; leaves downy. *Lightf.* p. 104. *Smith*, Fl. Brit. p. 134. *Hook.* Fl. Scot. p. 43. E. B. t. 1030.

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-

mote, about as long as the straight awn; stamens mostly 2; leaves nearly smooth. *Hook.* Fl. Scot. p. 43. *Smith*, Fl. Brit. p. 135. E. B. t. 1006.

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. *Panicle* 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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 171.)

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. *Panicle* 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.

2. A. *pubescens*, panicle erect, nearly simple; spikelets 3-flowered; pedicels of the florets villous; leaves plane, downy, with smooth margins. *Lightf.* p. 105. *Smith*, Fl. Brit. p. 140. *Hook.* Fl. Scot. p. 43. E. B. t. 1640.

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. *Panicle* 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, scariose and silvery. Apex of the inner valve bifid. *Awn* long, rough, brown, twisted, inserted about the middle.

3. A. *pratensis*, raceme erect, simple; spikelets about 5-flowered, longer than the calyx; leaves glabrous, rough at the margin, the lower ones involute. *Lightf.* p. 105. *Smith*, Fl. Brit. p. 141. *Hook.* Fl. Scot. p. 44. E. B. t. 1204.

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-

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.

4. A. *flavescens*, panicle lax, patent, branched; spikelets 3-flowered, longer than the calyx; awn inserted a little below the apex; root creeping. *Lightf.* p. 106. *Smith*, Fl. Brit. p. 142. *Hook.* Fl. Scot. p. 44. E. B. t. 952.

HAB. Pastures and sunny banks. Calton Hill, abundant, Mr Neill. Debris below Salisbury Craigs, abundant. July. ♃.

Yellow Oat-grass.—Culms erect, numerous, about 1 foot high. *Leaves* short, plane, linear-acute, slightly downy. *Panicle* shining, erect, 2–3 inches long, of a subpyramidal form, the branches patent, flexuose, rough. *Calycine 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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 170.)

* *Spike distichous.*

1. T. *junceum*, valves of the calyx obtuse, ribbed; spikelets of 4–5 awnless florets; leaves involute pungent; root creeping. *Lightf.* p. 109. *Smith*, Fl. Brit. p. 157. *Hook.* Fl. Scot. p. 144. E. B. t. 814.

HAB. Sandy banks by the sea-shore, frequent. At Granton. Between Burntisland and Pettycur. Near Portobello and Musselburgh. July. ♃.

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 striæ 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 *corollæ* 5-nerved.

2. T. *repens*, valves of the calyx lanceolato-subulate, many-nerved; florets 4–8 sub-awned; leaves plane; roots creeping. *Lightf.* p. 109. *Smith*, Fl. Brit. p. 158. *Hook.* Fl. Scot. p. 44. E. B. t. 909.

HAB. Fields, hedges, waste places, very common. June to September. ♃.

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 *corollæ* 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.*

Fl. Scot. p. 44. *Smith*, Fl. Brit. p. 159. E. B. t. 1372. *Elymus caninus*, *Lightf.* p. 108.

HAB. Woods and hedges, common about Edinburgh. Between Caroline Park and Cramond. Borders of fields between Edinburgh and the coast, both east and west. July. ♃.

Bearded Wheat-grass.—The habit of this plant is so much that of the last, that it is unnecessary to detail its characters. The difference resides in the present species having a fibrous instead of a creeping root; the spike being in general longer and more slender; and in the florets having much longer awns. The root is the best criterion.

* * *Spike secund.*

4. T. *loliaceum*, culms rigid, branched; spikes compressed; calyx-glumes obtuse, containing many awnless florets; root fibrous, annual. *Hook.* Fl. Scot. p. 45. *Smith*, Fl. Brit. p. 159. E. B. t. 221.

HAB. Walls and rocky waste places near the sea. Walls of Caroline Park, Maughan. Shores at Portobello, common, Mr Neill. Rocks east of Granton, and west pier of Burntisland, Mr Arnott. Pettycur. It is now scarcely to be found at Caroline Park. June, July. ☉.

Spiked Sea-Wheat-grass.—Whole plant remarkably rigid, and not more than 3–4 inches high. *Culms* many, ascending, branched, smooth. *Leaves* soon withering at the base, linear, roughish at the back. *Spike* about an inch long or more, straight, distichous, secund. *Spikelets* ovate, alternate, subsessile. *Florets* on a partial rachis; the valves nearly equal to those of the calyx, obtuse, and wholly awnless.—Much resembling *Poa rigida* in habit.

25. LOLIUM.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 167.)

1. L. *perenne*, spikelets much longer than the calyx, compressed; florets awnless. *Lightf.* p. 107. *Smith*, Fl. Brit. p. 148. *Hook.* Fl. Scot. p. 45. E. B. t. 315.

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.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 165.)

1. H. *murinum*, calycine valves of the intermediate floret linear-lanceolate, ciliated, those of the lateral florets setaceous, scabrous. *Lightf.* p. 108. *Smith*, Fl. Brit. p. 155. *Hook.* Fl. Scot. p. 46. E. B. t. 1971.

HAB. Walls, waste places, road-sides, very common. Everywhere about Edinburgh. June, July. ☉.

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.

2. H. *pratense*, all the glumes setaceous, scabrous. *Hook.* Fl. Scot. p. 46. *Smith*, Fl. Brit. p. 156. E. B. t. 409.

HAB. Meadows and pastures. East point of Salisbury Craigs, Mr J. Neill. June.

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. *Awns* not so long as in the last species.

27. ROTBOLLIA.

(*Nat. Ord.* GRAMINEÆ, *Hook.* Scot. 2. p. 165.)

1. R. *incurvata*, spike round, filiform, somewhat incurved; calyx 2-valved. *Hook.* Fl. Scot. p. 46. *Smith*, Fl. Brit. p. 151. E. B. t. 760. *Ægilops incurvata*, *Lightf.* p. 632.

β. more slender, spike nearly erect. *R. filiformis*, *Roth. G. Don*, Herb. Brit. No. 178.

HAB. On the sea-shore. β. salt-marshes near Aberlady Bay, *G. Don.* July, August. ☉.

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.

28. MONTIA.

(*Nat. Ord.* PORTULACEÆ, *Hook.* Scot. 2. p. 283.)

1. M. *fontana*.

Lightf. p. 110. *Smith*, Fl. Brit. p. 161. *Hook.* Fl. Scot. p. 47. E. B. t. 1206.

HAB. In wet places, common. On the summit of Salisbury Craigs, and on the whole bank from the summit. In the Hunters' Bog at the base of Arthur's Seat. June, July. ☉.

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.

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* 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.* DIPSACEÆ, *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. *Smith*, Fl. Brit. p. 168. E. B. t. 1032.

HAB. Waste places. Inchcolm, Maughan. South side of Duddingston Loch, Mr Neill. July. ♂.

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.* DIPSACEÆ, *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. *Smith*, Fl. Brit. p. 170. *Hook.* Fl. Scot. p. 49. E. B. t. 878.

HAB. Meadows, pastures, and waste places, common. July, August. ♃.

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. *Smith.* Fl. Brit. p. 170. *Hook.* Fl. Scot. p. 49. E. B. t. 659.

HAB. Meadows, corn-fields, waste places, frequent. Debris, Salisbury Craigs. Corn-fields about Newhaven and Caroline Park, abundant. July. ♃.

Field Scabious.—Root fusiform. *Stem* 2–3 feet high, branched, erect, rough with hairs. *Leaves; radical* ones long, lanceolate, serrated; *cauline* ones pinnatifid; pinnæ 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.

(*Nat. Ord.* RUBIACEÆ, *Hook.* Scot. 2. p. 247.)

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

sessile. *Lightf.* p. 114. *Smith*, Fl. Brit. p. 171. *Hook.* Fl. Scot. p. 50. E. B. t. 891.

HAB. Dry waste places, fallow-fields and road-sides. Very abundant in the King's Park, by the Duddingston road-side. Salisbury Craigs. The whole summer. ☉.

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.

(*Nat. Ord.* RUBIACEÆ, *Hook.* Scot. 2. p. 247.)

1. A. *odorata*, leaves about 8 in a whorl, oblongo-lanceolate; flowers paniculate, on peduncles. *Lightf.* p. 115. *Smith*, Fl. Brit. p. 172. *Hook.* Fl. Scot. p. 50. E. B. t. 755.

HAB. Woods and shady places. Debris below Salisbury Craigs, Mr Neill. Rosslyn and Auchindenny Woods, abundant. Colinton Woods. Braid Hermitage. May and June. ♃.

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 8 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.

(*Nat. Ord.* RUBIACEÆ, *Hook.* Scot. 2. p. 247.)

* *Fruit glabrous, flowers yellow.*

1. G. *verum*, leaves about 8 in a whorl, linear, grooved, entire; flowers in dense panicles. *Lightf.* p. 116. *Smith*, Fl. Brit. p. 178. *Hook.* Fl. Scot. p. 50. E. B. t. 660.

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.

2. G. *cruciatum*, leaves 4 in a whorl, hairy, ovate; flowers lateral, on shortly pedunculate, branched clusters; peduncles 2-leaved. *Hook.* Fl. Scot. p. 51. *Smith*, Fl. Brit. p. 173. E. B. t. 143. *Valantia cruciata*, *Lightf.* p. 633.

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. ♃.

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.*

3. G. *palustre*, leaves 4–6 in a whorl, oblongo-lanceolate, obtuse, unequal in size; stem weak, spreading, branched; branches patent. *Lightf.* p. 115. *Smith*, Fl. Brit. p. 174. *Hook.* Fl. Scot. p. 51. E. B. t. 1857.

HAB. Watery places, sides of lakes. Duddingston Loch. Lochend. Pentland Hills. July. ♃.

White 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.

4. G. *saxatile*, leaves 6 in a whorl, obovate, mucronate; stem procumbent, much branched, smooth. *Hook.* Fl. Scot. p. 51. *Smith*, Fl. Brit. p. 175. E. B. t. 815.—*G. montanum Huds.* (supposed by Lightfoot to be a variety of *G. uliginosum*, p. 115.

HAB. Dry banks in wooded and heathy situations, frequent. About rocky spots in the Pentland Hills, copiously. Rosslyn Woods. King's Park. Braid Hill, abundant. The whole summer. ♃.

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.

5. G. *erectum*, leaves about 8 in a whorl, lanceolate, mucronate, their margins rough with prickles pointing forwards; panicle trichotomous; stems weak, glabrous. *Hook.* Fl. Scot. p. 51. *Smith*, Fl. Brit. p. 176. E. B. t. 2067.

HAB. Hedges, moist places. Fish-wives' Causeway near Portobello, Maughan. July. ♃.

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.

6. G. *pusillum*, leaves about 8 in a whorl, linear-lanceolate, mucronate, hairy; "fruit very smooth," (Sm.); flowers mostly ternate. *Hook.* Fl. Scot. p. 52. *Smith*, Fl. Brit. p. 177. E. B. t. 74.

HAB. Rocky and moist alpine situations. Habbie's How in the Pentland Hills, G. Don and Maughan. August. ♃.

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.

7. G. *Mollugo*, leaves about 8 in a whorl, oblong, very obtuse below, shortly mucronate, very rough at the margin; flowers in very large loosely branched panicles. *Lightf.* p. 116. *Smith*, Fl. Brit. p. 178. *Hook.* Fl. Scot. p. 53. E. B. t. 1673.

HAB. Hedges and waste shady places, rare. By the road-side at Fourmile 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. ♃.

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. *Panicle* much branched, commencing often half way down the stem; irregularly subdivided. *Flowers* very numerous, white; segments of the corolla mucronate.

* * * *Fruit hispid.*

8. G. *Aparine*, leaves 6–8 in a whorl, linear-lanceolate, with the keel and margin rough with reflexed prickles; stem weak, armed with similar prickles. *Lightf.* p. 117. *Smith*, Fl. Brit. p. 180. *Hook.* Fl. Scot. p. 53. E. B. t. 816.

HAB. Hedges and waste grounds, extremely common. June, July. ☉.

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.

(*Nat. Ord.* PLANTAGINEÆ, *Hook.* Scot. 2. p. 209.)

* *Leaves ovate.*

1. Pl. *major*, leaves on longish foot-stalks; spikes cylindrical, very long; cells of the capsule many-seeded. *Lightf.* p. 117. *Smith*, Fl. Brit. p. 182. *Hook.* Fl. Scot. p. 53. E. B. t. 1558.

HAB. Pastures and road-sides, common. June, July. ♃.

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.

2. Pl. *media*, leaves ovate on very short foot-stalks; spike cylindrical; cells of the capsule 1-seeded. *Lightf.* p. 118. *Smith*, Fl. Brit. p. 183. *Hook.* Fl. Scot. p. 53. E. B. t. 1559.

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. ♃.

Hoary Plantain.—Root large and woody. *Leaves* all radical, spreading, appearing sessile, but having very short footstalks, mostly pubescent, 7–9

nerved. *Scape* 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.*

3. Pl. *lanceolata*, scape angular; spike ovate. *Lightf.* p. 118. *Smith*, Fl. Brit. p. 184. *Hook.* Fl. Scot. p. 54. E. B. t. 507.

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.

4. Pl. *maritima*, leaves linear, grooved, fleshy; scape rounded; spike cylindrical. *Lightf.* p. 118. *Smith*, Fl. Brit. p. 184. *Hook.* Fl. Scot. p. 54. E. B. t. 175.

HAB. Marshes, banks, and waste grounds on the sea-coast. Between Pettycur and Kirkcaldy. Caroline Park. Cramond Island, and the other islands of the Frith. July, August. ♃.

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.

5. Pl. *Coronopus*, leaves linear, pinnatifid; scape rounded; capsule of 4 1-seeded cells. *Lightf.* p. 118. *Smith*, Fl. Brit. p. 185. *Hook.* Fl. Scot. p. 54. E. B. t. 892.

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.

(*Nat. Ord.* BERBERIDEÆ, *Hook.* Scot. 2. p. 293.)

1. E. *alpinum.*

Hook. Fl. Scot. p. 55. *Smith*, Fl. Brit. p. 187. E. B. t. 438.

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 *petiols* swollen; *leaflets* heart-shaped, extremely delicate, ciliate at the margin, hairy beneath, cordate, serrate, *lateral ones* unequilateral;" *Hook.* *Flower-panicle* pedunculate; the peduncle arising from the same point as the leaf: the part is swollen, and is the base of the petiol; 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.

(*Nat. Ord.* CAPRIFOLIACEÆ, *Hook.* Scot. 2. p. 249.)

1. C. *sanguinea*, arborescent, branches straight; leave ovate,

green on both sides; cymes without involucre. *Hook.* Fl. Scot. p. 55. *Smith*, Fl. Brit. p. 188. E. B. t. 249.

HAB. Woods and hedges. Woods near Ravelrig-toll, Maughan. June, July. ♄.

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.

2. C. *suecica*, herbaceous, leaves ovate, sessile; flowers small, few, umbellate, surrounded by a 4-leaved, whitish, large involucre. *Lightf.* p. 119. *Smith*, Fl. Brit. p. 188. *Hook.* Fl. Scot. p. 55. E. B. t. 310.

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. ♃.

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.

(*Nat. Ord.* URTICEÆ, *Hook.* Scot. 2. p. 202.)

1. P. *officinalis*, leaves ovato-lanceolate, alternate; involucre of many ovate leaflets. *Lightf.* p. 634. *Smith*, Fl. Brit. p. 189. *Hook.* Fl. Scot. p. 56. E. B. t. 879.

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. ♃.

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.* ROSACEÆ, *Hook.* Scot. 2. p. 264.)

1. A. *vulgaris*, leaves many-lobed, plaited, serrate. *Lightf.* p. 120. *Smith*, Fl. Brit. p. 189. *Hook.* Fl. Scot. p. 56. E. B. t. 597.

HAB. Pastures, woods and brakes, road-sides, abundant. June, July. ♃.

Common Lady's Mantle.—Plant 6–14 inches high, bright pleasant green. *Stems* partly procumbent, erect, round, hairy, branched. *Radical leaves* elegant, on long petiols, large, roundish, lobed, more or less hairy; *stem* leaves small, nearly sessile, with 2 deeply-toothed connate 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.

p. 56. *Smith*, Fl. Brit. p. 190. E. B. t. 1011. *Aphanes arvensis*, *Lightf.* p. 121.

HAB. Fallow fields, road-sides, waste places, plentiful. May, June. ☉.

Field Lady's Mantle or *Parsley Piert.*—Stems more or less prostrate, much branched, about 6 inches long, very leafy. *Leaves* alternate, shortly petiolate, not plaited. *Stipules* partly arising from the petiol, deeply cleft. *Flowers* green, insignificant. *Calyx* very hairy.

II. TETRAGYNIA.

11. ILEX.

(*Nat. Ord.* CELASTRINÆ, *Hook.* Scot. 2. p. 271.)

1. I. *aquifolia*, leaves ovate, acute, spinous. *Lightf.* p. 121. *Smith*, Fl. Brit. p. 192. *Hook.* Fl. Scot. p. 57. E. B. t. 496.

HAB. Woods and hedges. Road leading from Craigleith quarries, Mr Neill. Rosslyn woods. June, July. ♄.

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.

(*Nat. Ord.* FLUVIALES, *Hook.* Scot. 2. p. 193.)

* *Upper leaves floating.*

1. P. *natans*, upper leaves oblong-ovate, petiolate; lower ones, membranaceous, gradually petiolate. *Lightf.* p. 121. *Smith*, Fl. Brit. p. 193. *Hook.* Fl. Scot. p. 57. E. B. t. 1822.

HAB. Ponds, lakes, slow streams. Water-pits at Corstorphine Hill. July. ♃.

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 petiols. *Flower-peduncles* with a similar appendage, thick and succulent. *Spikes* 1–2 inches long, rising above the water.

2. P. *fluitans*, upper leaves ovato-lanceolate, obtuse, shortly petiolate, lower ones lanceolate, long, sessile. *Hook.* Fl. Scot. p. 58. *Smith*, Fl. Brit. p. 1391. E. B. t. 1286.

HAB. Ditches and ponds. Ditches in the Pentland Hills. August, September. ♃.

Long-leaved Floating Pond-Weed.—Stems often very long, branched, leafy. *Upper leaves* somewhat coriaceous, subelliptic, finely veined, reddish, on short footstalks; *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.*

p. 122. *Smith*, Fl. Brit. p. 194. *Hook.* Fl. Scot. p. 58. E. B. t. 397.

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.

4. P. *lucens*, leaves ovato-lanceolate, petiolate; spike crowded with flowers. *Lightf.* p. 122. *Smith*, Fl. Brit. p. 194. *Hook.* Fl. Scot. p. 58. E. B. t. 376.

HAB. Rivers and lakes. Bogsmill, Slateford, Maughan. Lochend, abundant, Mr Neill. July. ♃.

Shining Pond-weed.—Stems long, wholly submersed, nearly simple. *Leaves* alternate, entire, plane, or slightly waved, ribbed, pellucid, remarkably shining, on short petiols. *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.

5. P. *crispum*, leaves oblong-lanceolate, alternate, sessile, much waved, serrate. *Lightf.* p. 122. *Smith*, Fl. Brit. p. 195. *Hook.* Fl. Scot. p. 58. E. B. t. 1012.

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.

6. P. *pusillum*, "leaves linear, opposite and alternate, distinct, spreading from the base; stem cylindrical;" *Sm. Lightf.* p. 124. *Smith*, Fl. Brit. p. 197. *Hook.* Fl. Scot. p. 59. E. B. t. 215.

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.

7. P. *pectinatum*, leaves setaceous, sheathing, distichous. *Lightf.* p. 123. *Smith*, Fl. Brit. p. 197. *Hook.* Fl. Scot. p. 59. E. B. t. 323. *P. marinum*, *Lightf.* p. 124.

HAB. Lakes and salt-water ditches. Lochend, Mr Neill. Duddingston Loch, not plentiful. July. ♃.

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.*

Lightf. p. 124. *Smith*, Fl. Brit. p. 198. *Hook.* Fl. Scot. p. 59. E. B. t. 136.

HAB. Ditches and stagnant waters by the sea-side. Guillon Links, Aberlady Bay, in salt-water pools, Maughan. July, August. ♃.

Sea-Ruppia.—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 *Vallisneria spiralis*;" (*Hooker's* admirable illustrations in *Flora Londinensis.*)

14. SAGINA.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 279.)

1. S. *procumbens*, stems procumbent, smooth; leaves shortly mucronate; petals very small. *Lightf.* p. 125. *Smith*, Fl. Brit. p. 199. *Hook.* Fl. Scot. p. 59. E. B. t. 880.

HAB. Sandy and gravelly places, common. June, July. ♃.

Procumbent Pearlwort.—Stems many, 2–4 inches long, glabrous, radicating 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.

2. S. *maritima*, stems sub-erect, smooth; leaves fleshy, obtuse; petals none; capsule not longer than the calyx. *Hook.* Fl. Scot. p. 60. *Don's* Fasc. 7. No. 155. E. B. t. 2195.

HAB. On the sea-coast. Queensferry, and near Edinburgh, G. Don. May to August. ☉.

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.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 224.)

1. M. *sylvatica*, " leaves oblongo-lanceolate, with soft hairs; racemes very long, lax, pedicels (*in fruit*) divergent-patent, longer than the 5-cleft connivent calyx; limb of the corolla expanded, longer than the tube." *Hook.* Fl. Scot. p. 66. *Lehm.* Asperif. p. 85. *M. scorpioides* γ, *Smith*, Fl. Brit. p. 212.

HAB. Woods and coppices, common. Summer. ♃.

Wood Scorpion-grass.—Perennial. *Stems* 12–18 inches high, rather lax, with soft spreading hairs. *Leaves; radical* ones spathulate; *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.

2. M. *palustris*, " leaves oblongo-lanceolate, rough with short, mostly appressed hairs; racemes rather short; peduncles (*in fruit*) divergent, twice as long as the 5-cleft patent calyx; limb of the corolla expanded, longer than the tube." *Hook.* Fl. Scot. p. 67. E. B. t. 1973. *M. scorp.* δ, *Smith*, Fl. Brit. p. 212.

HAB. Banks of ditches and rivers, marshes, very common. King's Park. Duddingston Loch. Hope Park, &c. Summer. ♃.

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.

3. M. *arvensis*, " leaves oblong-lanceolate, hairy; racemes very long; pedicels (*in fruit*) patent, twice as long as the 5-cleft and closed calyx; limb of the corolla erecto-patent, about as long as the tube." *Hook.* Fl. Scot. p. 67. E. B. t. 2558. (not the figure.) *M. scorp.* α, *Smith*, Fl. Brit. p. 212.

HAB. Fields, waste places, road-sides, common. June, July. ☉.

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 oblong-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,

shorter than the tube." *Hook.* Fl. Scot. p. 67. E. B. t. 480. f. 1. *M. scorp.* β. *Smith*, Fl. Brit. p. 212. *M. arvensis*, E. B. t. 2558. (The figure at least.)

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 divaricate. *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.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 224.)

1. L. *officinale*, stem erect, branched; leaves lanceolate, hairy beneath; tube of the corolla as long as the calyx; fruit smooth. *Lightf.* p. 132. *Smith*, Fl. Brit. p. 213. *Hook.* Fl. Scot. p. 68. E. B. t. 134.

HAB. Fields and waste places, rare. Under the west side of Salisbury Craigs, 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.

2. L. *arvense*, stem erect; leaves lanceolate; tube of the corolla a little longer than the calyx, the segments of which expand when in fruit; fruit rugose. *Lightf.* p. 133. *Smith*, Fl. Brit. p. 213. *Hook.* Fl. Scot. p. 68. E. B. t. 123.

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 axillæ 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.

3. L. *maritimum*, glabrous, stem procumbent; leaves ovate, glaucous, fleshy; flowers on longish peduncles. *Hook.* Fl. Scot. p. 68. *Lehm.* Asperif. p. 291. *Pulmonaria maritima*, *Lightf.* p. 134. t. 7. *Smith*, Fl. Brit. p. 218. E. B. t. 368.

HAB. Sea-coast among stones, rare in this neighbourhood. Near Seafield Tower, Fifeshire, Messrs Somerville and E. Maughan. July, August. ♃.

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.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 224.)

1. A. *sempervirens*, leaves ovate, the lower ones petiolate; small clusters of flowers, on axillary peduncles, accompanied by 2 leaves. *Lightf.* p. 133. *Smith*, Fl. Brit. p. 215. *Hook.* Fl. Scot. p. 68. E. B. t. 45.

HAB. Waste place. Deanbank, near the village of the Water of Leith, Maughan. Craigmillar Castle, Mr Neill, 1799. May, June. ♃.

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.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 225.)

1. C. *officinale*, fœtid; leaves lanceolate, attenuate at the base, sessile, pubescent; stamens shorter than the corolla. *Lightf.* p. 133. *Smith*, Fl. Brit. p. 216. *Hook.* Fl. Scot. p. 69. E. B. t. 1642.

HAB. Banks and waste places. Burntisland and Kinghorn, Lightfoot. Rosslyn Castle; and on Inchcolm, Mr Neill. 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. ♂.

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.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 225.)

1. P. *officinalis*, leaves scabrous, the superior ones of the stem sessile, ovate; radical ones ovato-cordate, acuminate. *Hook.* Fl. Scot. p. 69. *Smith*, Fl. Brit. p. 217. E. B. t. 118.

HAB. Woods. Arniston woods, abundant; banks of the N. Esk, near Kevockmill, Maughan. May. ♃.

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.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 225.)

1. S. *officinale*, leaves ovato-lanceolate, very decurrent, and

winging the upper part of the stem. *Lightf.* p. 134. *Smith*, Fl. Brit. p. 218. *Hook.* Fl. Scot. p. 69. E. B. t. 817.

HAB. Moist woods and banks of streams. Water of Leith, opposite St Bernard's Well, Dr Parsons. Craigcrook, Mr D. Steuart. May, June. ♃.

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 petiols, 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.

2. S. *tuberosum*, leaves ovato-oblong, attenuated at the base, upper ones very slightly decurrent. *Lightf.* p. 1091. *Smith*, Fl. Brit. p. 219. *Hook.* Fl. Scot. p. 69. E. B. t. 1502.

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. ♃.

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.

7. BORAGO.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 225.)

1. B. *officinalis*, very hispid; lower leaves obovate, attenuated at the base; segments of the calyx and corolla spreading. *Hook.* Fl. Scot. p. 70. *Smith*, Fl. Brit. p. 219. E. B. t. 36.

HAB. Rubbish and waste places. Burntisland, Maughan. Debris of Salisbury Craigs, Mr Bainbridge. June, July. ♂.

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.

8. ASPERUGO.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 225.)

1. As. *procumbens.*

Lightf. p. 135. *Smith*, Fl. Brit. p. 220. *Hook.* Fl. Scot. p. 70. E. B. t. 661.

HAB. Waste places, rare. Guillon Links, Messrs Arnott and Stewart. June, July. ☉.

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*.

which are curved downwards when in fruit. *Calyx* becoming much larger after flowering.

9. LYCOPSIS.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 225.)

1. L. *arvensis*, leaves lanceolate, repando-denticulate, very hispid; calyx erect while in flower, shorter than the tube of the corolla. *Lightf.* p. 135. *Smith*, Fl. Brit. p. 221. *Hook.* Fl. Scot. p. 70. E. B. t. 938.

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.

(*Nat. Ord.* BORAGINEÆ, *Hook.* Scot. 2. p. 225.)

1. E. *vulgare*, stem bristly and tuberculate; leaves lanceolate, very hispid; flowers in lateral spikes; stamens longer than the corolla. *Lightf.* p. 136. *Smith*, Fl. Brit. p. 222. *Hook.* Fl. Scot. p. 70. E. B. t. 181.

HAB. Road-sides, and waste rugged places. Kirkcaldy and Kinghorn, and under Arthur's Seat, Lightfoot. Very abundant on the east side of Lochend, and on the debris of Salisbury Craigs. June, July. ♂.

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.* PRIMULACEÆ, *Hook.* Scot. 2. p. 211.)

1. P. *vulgaris*, leaves dentate, rugose; scape one-flowered; limb of the corolla plane. *Hook.* Fl. Scot. p. 71. *Smith*, Fl. Brit. p. 222. E. B. t. 4. *P. veris*, γ. *Lightf.* p. 136.

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.

2. P. *veris*, leaves dentate, rugose, contracted below the middle: scape umbellate; flowers drooping; limb of the corolla concave. *Lightf.* p. 136. *Smith*, Fl. Brit. p. 223. *Hook.* Fl. Scot. p. 71. E. B. t. 5.

HAB. Pastures and woods. King's Park, and Caroline Park, Mr Neill. By no means common near Edinburgh. May. ♃.

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 peduncles. *Corolla* small, tawny yellow, the limb concave, paler beneath; segments shortly obcordate.

3. P. *elatior*, leaves dentate, rugose; scape many-flowered; limb of the corolla plane. *Hook.* Fl. Scot. p. 71. *Smith*, Fl. Brit. p. 223. E. B. t. 513. *P. Veris*, β. *Lightf.* p. 136.

HAB. Woods and hedgebanks. Colinton; sea-coast between Queensferry 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. *Scapes* 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*.

4. P. *farinosa*, "leaves obovate-lanceolate, farinose, crenulate; calyx oblong-ovate; limb of the corolla plane, the orifice of the tube scarcely glandular; segments obcordate, attenuated at the base, distant;" (*Hook.* in Fl. Lond. under P. Scotica). Fl. Scot. p. 71. *Lightf.* p. 137. *Smith*, Fl. Brit. p. 224. E. B. t. 6.

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.

(*Nat. Ord.* GENTIANEÆ, *Hook.* Scot. 2. p. 228.)

1. M. *trifoliata*, leaves ternate. *Lightf.* p. 137. *Smith*, Fl. Brit. p. 225. *Hook.* Fl. Scot. p. 71. E. B. t. 495.

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.

(*Nat. Ord.* PRIMULACEÆ, *Hook.* Scot. 2. p. 209.)

1. L. *thyrsiflora*, flowers in pedunculate lateral racemes;

leaves opposite, lanceolate. *Hook.* Fl. Scot. p. 72. *Smith*, Fl. Brit. p. 228. E. B. t. 176.

HAB. Watery places, rare. Duddingston Loch, D. Don. July. ♃.

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.

2. L. *Nemorum*, leaves ovate, acute, petiolate; stem creeping; flowers on solitary peduncles; calycine segments linear-subulate. *Lightf.* p. 138. *Smith*, Fl. Brit. p. 228. *Hook.* Fl. Scot. p. 72. E. B. t. 527.

HAB. Woods and shaded moist banks, frequent. Rosslyn and Auchindenny woods. The whole summer. ♃.

Yellow Pimpernel, or *Wood Loosestrife.*—Stem branched, creeping, radicating, 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.

(*Nat. Ord.* PRIMULACEÆ, *Hook.* Scot. 2. p. 211.)

1. A. *arvensis*, leaves ovate, sessile, dotted beneath; "margin of the corolla broadly and very obtusely crenate, piloso-glandulose." *Hook.* Fl. Scot. p. 72. *Lightf.* p. 139. *Smith*, Fl. Brit. p. 230. E. B. t. 529.

HAB. Corn-fields, common. June, July. ☉.

Scarlet Pimpernel.—Stems much branched, square, smooth. *Leaves* entire, longitudinally veined. *Flowers* bright scarlet, on solitary, axillary peduncles. *Capsule* globose.

2. A. *tenella*, stem creeping, filiform; leaves roundish-ovate, petiolate; filaments covered with a white down. *Lightf.* p. 139. *Smith*, Fl. Brit. p. 230. *Hook.* Fl. Scot. p. 73. E. B. t. 530.

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. ♃.

Bog Pimpernel.—Stems branched, radicating, 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.

(*Nat. Ord.* CONVOLVULACEÆ, *Hook.* Scot. 2. p. 226.)

1. C. *arvensis*, leaves sagittate, with acute lobes; bracteas one pair, minute, remote from the flower. *Lightf.* p. 140. *Smith*, Fl. Brit. p. 232. *Hook.* Fl. Scot. p. 73. E. B. t. 312.

HAB. Corn-fields, dry banks, road-sides, frequent. Piershill Barracks,

and near Lochend, Mr Neill. Kirkcaldy abundant, especially towards the sea-shore, Mr Arnott. Fields about Leith Links, Mr Bainbridge. River-side below Canonmills, Mr D. Steuart. Road-side east from Canonmills. Road-sides about Newhaven. June, July. ♃.

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.

2. C. *Sepium*, leaves sagittate, with the lobes truncate; bracteas one pair, large, cordate, close to the flower. *Lightf.* p. 140. *Smith*, Fl. Brit. p. 233. *Hook.* Fl. Scot. p. 74. E. B. t. 313.

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. ♃.

Great Bindweed.—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.

(*Nat. Ord.* POLEMONIACEÆ, *Hook.* Scot. 2. p. 227.)

1. P. *cæruleum*, leaves pinnate; flowers erect, calyx longer than the tube of the corolla. *Hook.* Fl. Scot. p. 74. *Smith*, Fl. Brit. p. 234. E. B. t. 14.

HAB. Moist woods. Sea-coast two miles east of S. Queensferry, growing with *Arundo arenaria*, Maughan. Arniston woods, Mr Arnott. Blackford Hill, Mr Bainbridge. July. ♃.

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.

(*Nat. Ord.* CAMPANULACEÆ, *Hook.* Scot. 2. p. 233.)

1. C. *rotundifolia*, glabrous, radical leaves rotundo-cordate, crenate or cut; cauline ones linear, entire. *Lightf.* p. 141. *Smith*, Fl. Brit. p. 235. *Hook.* Fl. Scot. p. 74. E. B. t. 866.

HAB. Pastures and waste places, very common. August, September. ♃.

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* lanceolato-subulate, entire, spreading.—The corolla is sometimes white.

2. C. *latifolia*, leaves ovate-lanceolate, scabrous, toothed; stem round, simple; flowers solitary, pedunculate; fruit drooping. *Lightf.* p. 141. *Smith*, Fl. Brit. p. 236. *Hook.* Fl. Scot. p. 75. E. B. t. 302.

HAB. Woods and hedges, stream-sides. Colinton and Rosslyn woods, Maughan. August. ♃.

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.

3. C. *rapunculoides*, leaves cordate-lanceolate, scabrous, crenate; stem branched; flowers solitary, axillary, drooping; calycine segments patent. *Hook.* Fl. Scot. p. 75. *Smith*, Fl. Brit. p. 237. E. B. t. 1369.

HAB. Woods and fields, rare. Corn-fields two miles NW. from Kirkcaldy, Mr Chalmers. July, August. ♃.

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.

4. C. *glomerata*, stem angular, simple; leaves scabrous, crenate, cauline ones ovato-lanceolate, sessile, semiamplexicaul; flowers sessile, forming a terminal cluster. *Lightf.* p. 142. *Smith*, Fl. Brit. p. 238. *Hook.* Fl. Scot. p. 75. E. B. t. 90.

HAB. Dry pastures and banks, rare. Hills behind Pettycur, Mr Neill. Links near Gosford, Maughan. Steep banks on the sea-shore between Pettycur and Kinghorn, but nearest the latter. July, August. ♃.

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.

(*Nat. Ord.* VIOLACEÆ, *Hook.* Scot. 2. p. 284.)

* *Stipules undivided.*

1. V. *hirta*, stemless; leaves cordate, rough as well as the petiols with hairs; calyx obtuse. *Hook.* Fl. Scot. p. 76. *Smith*, Fl. Brit. p. 244. E. B. t. 894.

HAB. Woods, pastures, moist banks. Bank near the toll, North Queensferry, Mr Neill. Blackford Hills, and Links between Cockenzie and Gosford, Maughan. Guillon Links, Mr Arnott. Auchtertoul Linn, Fifeshire.

Hairy Violet.—Stem none. *Stolons* short, prostrate, not taking root. *Leaves* on long hairy petiols, 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.

2. V. *odorata*, stemless; stoloniferous; leaves cordate, smooth as well as the petiols; calyx obtuse. *Lightf.* p. 507. *Smith*, Fl. Brit. p. 245. *Hook.* Fl. Scot. p. 77. E. B. t. 619.

HAB. Hedges and banks, rare about Edinburgh. Bank near Slateford aqueduct, Mr Sivright. Colinton woods. March, April. ♃.

Sweet Violet.—Stolons long, leafy, taking root. *Leaves* broadly heart-shaped, on long, erect, petiols, 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.

3. V. *palustris*, stemless; leaves reniform, smooth. *Lightf.* p. 506. *Smith*, Fl. Brit. p. 246. *Hook.* Fl. Scot. p. 77. E. B. t. 444.

HAB. Bogs and marshy grounds. Ravelrig toll moss, Mr Arnott. Pentland Hills; Rosslyn woods, Mr Neill. King's Park. May, June. ♃.

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.

4. V. *canina*, stem at length ascending, channelled; leaves cordate, somewhat acute; stipules dentato-ciliate; calyx acute. *Lightf.* p. 508. *Smith*, Fl. Brit. p. 246. *Hook.* Fl. Scot. p. 77. E. B. t. 620.

HAB. Woods, hedge-banks, &c.; very common. April, May. ♃.

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.*

5. V. *tricolor*, stem angular, branched, spreading; leaves oblong, deeply crenate; stipules lyrate, pinnatifid. *Lightf.* p. 509. *Smith*, Fl. Brit. p. 248. *Hook.* Fl. Scot. p. 77. E. B. t. 1287.

HAB. Corn-fields, waste places, very common. The whole summer. ☉

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.

6. V. *lutea*, stem simple, erect, angular; leaves ovate-oblong, crenate or toothed; stipules deeply lobed, palmate. *Hook.* Fl. Scot. p. 77. *Smith*, Fl. Brit. p. 248. E. B. t. 721. *V. grandiflora*, *Lightf.* p. 508.

HAB. Hilly pastures. Arthur's Seat, Mr Neill. Corstorphine and Pentland Hills, Maughan. Braid and Blackford Hills. June to September. ♃?

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.* SOLANEÆ, *Hook.* Scot. 2. p. 222.)

1. V. *Thapsus*, leaves decurrent, woolly on both sides; stem simple. *Lightf.* p. 143. *Smith*, Fl. Brit. p. 249. *Hook.* Fl. Scot. p. 78. E. B. t. 549.

HAB. Dry waste places. Blackford Hill, Maughan. Between E. and W. Weems, Fifeshire (18 miles from Edinburgh), Lightfoot. July. ♂.

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.

2. V. *nigrum*, leaves oblong-cordate, petiolate, irregularly crenate subpubescent. *Hook.* Fl. Scot. p. 78. *Smith*, Fl. Brit. p. 251. E. B. t. 59.

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. ♃.

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.* SOLANEÆ, *Hook.* Scot. 2. p. 223.)

1. H. *niger*, leaves sinuate, amplexicaul; flowers sessile. *Lightf.* p. 144. *Smith*, Fl. Brit. p. 254. *Hook.* Fl. Scot. p. 78. E. B. t. 591.

HAB. Waste places. East side of Lochend. South-east end of the debris of Salisbury Craigs, Mr Neill. June. ♂.

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.* SOLANEÆ, *Hook.* Scot. 2. p. 223.)

1. A. *Belladonna*, stem herbaceous; leaves ovate, undivided. *Lightf.* p. 144. *Smith*, Fl. Brit. p. 255. *Hook.* Fl. Scot. p. 78. E. B. t. 592.

HAB. Hedges and waste places. Sea-side immediately west of the waggon road from Limekilns. On Inchcolm, and near the ruins of Borthwick Castle, Mr Neill and Maughan. June, July. ♃.

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* viscous. *Fruit* shining black, as large as a small cherry, 2-celled.—Highly poisonous.

22. SOLANUM.

(*Nat. Ord.* SOLANEÆ, *Hook.* Scot. 2. p. 223.)

1. S. *Dulcamara*, stem shrubby, thornless, somewhat climbing; upper leaves irregularly hastate; corymbs opposite to the leaves, drooping. *Lightf.* p. 145. *Smith*, Fl. Brit. p. 256. *Hook.* Fl. Scot. p. 79. E. B. t. 565.

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 Starleyburn, Mr D. Steuart. June, July. ♄.

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 corymbs, 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.)

1. E. *Centaurium*, stem somewhat branched; leaves all ovate-oblong; flowers nearly quite sessile; calyx much shorter than the tube of the corolla. *Hook.* Fl. Scot. p. 79. *Gentiana Centaurium*, *Lightf.* p. 152. *Chironia Cent.*, *Smith*, Fl. Brit. p. 257. E. B. t. 417.

HAB. Dry pastures. Black Jock's Hill, near Burntisland; Dalhousie Castle; Dunearn Hill, Mr Neill. Hill at North Queensferry, plentiful, Mr D. Steuart. July, August. ☉.

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.

2. E. *pulchella*, dwarfish; stem much branched; leaves ovate-oblong; flower pedicellate, in lax corymbose panicles; calyx nearly as long as the tube of the corolla. *Hook.* Fl. Scot. p. 79. *Chironia pulchella*, *Smith*, Fl. Brit. p. 258. E. B. t. 458.

HAB. Sandy pastures near the sea. Near Guillon Links, D. Don. August, September. ☉.

Dwarf-branched Erythræa.—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.

3. E. *littoralis*, stem mostly simple; cauline leaves linear-obtuse, and somewhat obovate. *Hook.* Fl. Scot. p. 80. *Chironia litt.* E. B. t. 2305. *Ch. pulchella*, *Don's* Fasc. 1.

HAB. Sea-coast. Guillon Links, Maughan. June. ⊙.

Dwarf Sea-side Erythræa.—Stem simple or branched, 2–3 inches high, leafy, angular. *Radical 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.

24. SAMOLUS.

(*Nat. Ord.* PRIMULACEÆ, *Hook.* Scot. 2. p. 212.)

1. S. *Valerandi*, leaves obtuse; racemes many-flowered; pedicels bearing a minute bractea about the middle. *Lightf.* p. 142. *Smith*, Fl. Brit. p. 259. *Hook.* Fl. Scot. p. 80. E. B. t. 703.

HAB. Watery places, especially near the sea. Limekilns, Fifeshire, and Guillon Links, Maughan. South Queensferry, Mr Neill. Links near St Germains, Mr D. Steuart. July. ♃.

Brook-weed 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 bracteas. *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.

(*Nat. Ord.* CAPRIFOLIACEÆ, *Hook.* Scot. 2. p. 248.)

1. L. *Caprifolium*, flowers ringent, whorled, sessile; upper leaves connate-perfoliate. *Hook.* Fl. Scot. p. 80. *Smith*, Fl. Brit. p. 260. E. B. t. 799.

HAB. Woods. Colinton woods, Messrs Maughan and Weatherhead. Corstorphine Hill, Maughan. June. ♄.

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.

2. L. *Periclymenum*, flowers ringent, capitate, terminal; leaves all distinct. *Lightf.* p. 80. *Smith*, Fl. Brit. p. 260. *Hook.* Fl, Scot. p. 80. E. B. t. 800.

HAB. Woods and hedges, frequent. July. ♄.

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.

26. EUONYMUS.

(*Nat. Ord.* CELASTRINÆ, *Hook.* Scot. 2. p. 271.)

1. E. *europæus*, "flowers often tetrandrous; peduncles compressed, many-flowered; leaves ovato-lanceolate, on short

foot-stalks; branches smooth." *Hook.* Fl. Scot. p. 81. *Lightf.* p. 145. *Smith*, Fl. Brit. p. 262. E. B. t. 766.

HAB. Woods and hedges. King's Park near St Anthony's Well, and near Craigmillar Castle, Maughan. May. ♄.

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 tetrandous and with 4 petals. *Petals* small. *Capsule* 5-angled, pinkish red, 5-celled; each cell containing 1 seed.—Poisonous.

27. RIBES.

(*Nat. Ord.* GROSSULARIÆ, *Hook.* Scot. 2. p. 257.)

1. R. *nigrum*, thornless; racemes pubescent, lax, pendulous, with a simple flower-stalk at their base; leaves punctato-glandulose beneath. *Lightf.* p. 146. *Smith*, Fl. Brit. p. 265. *Hook.* Fl. Scot. p. 82. E. B. t. 1291.

HAB. Damp woods. Auchindenny woods, Messrs Shuter and Maughan. May. ♄.

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.

2. R. *Grossularia*, branches prickly; peduncles of the leaves hairy; pedicels single-flowered, with a pair of minute bracteas; fruit hairy. *Hook.* Fl. Scot. p. 82. *Smith*, Fl. Brit. p. 266. E. B. t. 1292.

HAB. Woods and waste grounds. King's Park, Mr Bainbridge. April, May. ♃.

Rough Gooseberry.—A low bushy shrub, with erect prickly stems and branches. *Leaves* rounded, lobed, serrate. *Flowers* drooping, brownish green. *Berries* pendulous, hispid, rarely smooth.—Scarcely indigenous.

28. HEDERA.

(*Nat. Ord.* CAPRIFOLIACEÆ, *Hook.* Scot. 2. p. 249.)

1. H. *Helix*, leaves 5-lobed, the lobes angular; floral leaves ovate. *Lightf.* p. 146. *Smith*, Fl. Brit. p. 267. *Hook.* Fl. Scot. p. 82. E. B. t. 1267.

HAB. Rocks and trunks of trees, common. October, November. ♄.

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. *Peduncles* downy. *Stamens* fully as long as the petals. *Berries* globular, purple-black; mealy within.

29. GLAUX.

(*Nat. Ord.* PRIMULACEÆ, *Hook.* Scot. 2. p. 212.)

1. G. *maritima*.

Lightf. p. 147. *Smith*, Fl. Brit. p. 268. *Hook.* Fl. Scot. p. 82. E. B. t. 1267.

HAB. Sea-shore, among stones, and in muddy places. Shores of the Frith. North Queensferry, and Musselburgh Links, Mr Neill. About Burntisland and Pettycur. July. ♃.

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.)

1. V. *minor*, stems procumbent; leaves elliptico-lanceolate, margin glabrous; calycine segments lanceolate, glabrous. *Lightf.* p. 147. *Smith*, Fl. Brit. p. 270. *Hook.* Fl. Scot. p. 82. E. B. t. 917.

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.

2. V. *major*, stems ascending; leaves subcordate, the margin ciliated; calycine segments long, setaceous. *Hook.* Fl. Scot. p. 83. *Smith*, Fl. Brit. p. 270. E. B. t. 514.

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.*

1. Ch. *maritimum*, leaves subulate, semicylindrical; flowers axillary, sessile. *Lightf.* p. 150. *Smith*, Fl. Brit. p. 278. *Hook.* Fl. Scot. p. 83. E. B. t. 633.

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. *Stamens* shorter than the petals.

** *Leaves plane, undivided, entire.*

2. Ch. *olidum*, leaves ovate-rhomboid, entire; flowers in dense clustered spikes; stems spreading. *Hook.* Fl. Scot. p. 83. *Smith*, Fl. Brit. p. 277. E. B. t. 1034. *Ch. Vulvaria*, *Lightf.* p. 149.

HAB. 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 pulverulent 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.*

3. Ch. *Bonus Henricus*, leaves triangular, sagittate, entire; spikes compound, terminal and axillary, leafless. *Lightf.* p. 147. *Smith*, Fl. Brit. p. 272. *Hook.* Fl. Scot. p. 83. E. B. t. 1033.

HAB. Waste places and road-sides, common. Road-side near Merchiston Castle. August. ♃

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 hastate 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.

4. Ch. *urbicum*, leaves triangular, toothed; spiked clusters, elongated, approaching the stem, nearly leafless; seeds rather large. *Lightf.* p. 148. *Smith*, Fl. Brit. p. 273. *Hook.* Fl. Scot. p. 83. E. B. t. 717.

HAB. 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.

5. Ch. *rubrum*, leaves rhomboid-triangular, deeply toothed and sinuate; flowers in a number of small oblong, obtuse, clustered, axillary and terminal spikes; seeds very minute. *Lightf.* p. 148. *Smith*, Fl. Brit. p. 274. *Hook.* Fl. Scot. p. 84. E. B. t. 1721.

HAB. 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.

6. Ch. *hybridum*, leaves cordate, angulato-dentate, acute; clusters much branched in a somewhat cymose manner, divaricate, leafless. *Lightf.* p. 149. *Smith*, Fl. Brit. p. 275. *Hook.* Fl. Scot. p. 84. E. B. t. 1919.

HAB. Waste places and cultivated fields. About Edinburgh, G. Don. August. ☉.

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 fœtid.

7. Ch. *album*, leaves ovate, inclining to rhomboid, jagged, entire at the base; upper ones perfectly so; flowers in dense, spiked, leafy clusters. *Lightf.* p. 148. *Smith*, Fl. Brit. p 275. *Hook.* Fl. Scot. p. 84. E. B. t. 1723.

HAB. Waste places, dunghills, &c., common. July, August. ⊙.

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 Linnæus.

32. BETA.

(*Nat. Ord.* CHENOPODEÆ, *Hook.* Scot. 2. p. 208.)

1. B. *maritima*, stems procumbent at the base; flowers mostly in pairs; calycine segments entire. *Lightf.* p. 150. *Smith*, Fl. Brit. p. 279. *Hook.* Fl. Scot. p. 84. E. B. t. 285.

HAB. Sea-coast in muddy places. Opposite Gosford Gate, Mr Neill. Sea-shore near Kirkcaldy, Messrs Maughan and Sommerville. Near Cramond, Dr Willis. August. ♃.

Sea-side Beet.—Root perennial, thick, fleshy. *Stems* several, branched, tall, angular. *Leaves* ovate, smooth; *radical* ones large, spreading, succulent, petiolate; *cauline* ones subsessile, 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.

(*Nat. Ord.* CHENOPODEÆ, *Hook.* Scot. 2. p. 208.)

1. S. *Kali*, stem herbaceous, procumbent; leaves subulate, spinous, scabrous; segments of the axillary perianth with a scariose margin. *Lightf.* p. 151. *Smith*, Fl. Brit. p. 280. *Hook.* Fl. Scot. p. 85. E. B. t. 634.

HAB. Sandy sea-shores, frequent. Inchcolm, Mr Neill. About Musselburgh. July. ⊙.

Prickly Saltwort.—Stems much branched, rigid, angled, hairy. *Leaves* alternate, grooved, patent, fleshy, very spinous. *Flowers* solitary, axillary, sessile, with three leaf-like bracteas at the base of each. *Fruit* inclosed by the perianth; the cotyledons large, and forming a curious and obvious spiral.

34. ULMUS.

(*Nat. Ord.* ULMACEÆ, *Hook.* Scot. 2. p. 201.)

1. U. *campestris*, "leaves doubly serrate, scabrous, unequal at the base; flowers nearly sessile, 4-cleft, with 4 stamens; fruit oblong, naked;" (Sm.) *Lightf.* p. 151. *Smith*, Fl. Brit. p. 281. *Hook.* Fl. Scot. p. 85. E. B. t. 1886.

HAB. Woods and hedges, common. Hedges and plantations about Edinburgh, Lightfoot. April. ♄.

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.

HAB. Woods and hedges, common. Abundant in Scotland, Lightfoot in Append., under *U. campestris*, p. 1094. The Meadow-Walks. April. ♄.

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.

(*Nat. Ord.* CONVOLVULACEÆ, *Hook.* Scot. 2. p. 226.)

1. C. *europæa*, flowers sessile, corolla without scales at the base of the stamens; stigmas simple. *Hook.* Fl. Scot. p. 86. *Smith*, Fl. Brit. p. 282. E. B. t. 378.

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.

(*Nat. Ord.* GENTIANEÆ, *Hook.* Scot. 2. p. 227.)

1. G. *amarella*, corolla 5-cleft; hypocrateriform, bearded in the orifice; calyx 5-cleft, the segments equal. *Lightf.* p. 152. *Smith*, Fl. Brit. p. 287. *Hook.* Fl. Scot. p. 86. E. B. t. 236.

HAB. Dry pastures, rare. Links to the eastward of Cockenzie, Maughan. East side of Arthur's Seat, Mr Neill. Guillon Links, Mr Arnott. August. ☉.

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.

2. G. *campestris*, corolla 4-cleft, bearded in the orifice; calyx of four leaflets, the outer one very large. *Lightf.* p. 152. *Smith*, Fl. Brit. p. 288. *Hook.* Fl. Scot. p. 86. E. B. t. 237.

HAB. Pastures, frequent. Hills between Pettycur and Burntisland; and King's Park, Maughan. Pentland Hills, Mr Arnott. September, October. ☉.

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.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 250.)

1. E. *maritimum*, radical leaves roundish, plaited, spinous; flowers capitate; scales of the receptacle 3-cleft. *Lightf.* p. 153. *Smith*, Fl. Brit. p. 288. *Hook.* Fl. Scot. p. 87. E. B. t. 718.

HAB. Sandy sea-coasts. Musselburgh and Largo Bay, Lightfoot. July, August. ♃.

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. *Involucre* immediately under the flowers, similar to the leaves.—The whole plant is remarkably glaucous, and rigid.

38. HYDROCOTYLE.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 250.)

1. H. *vulgaris*, leaves peltate, orbicular, crenate; umbellate head, 5–8 flowered. *Lightf.* p. 154. *Smith*, Fl. Brit. p. 290. *Hook.* Fl. Scot. p. 87. E. B. t. 751.

HAB. Bogs and wet meadows, frequent. King's Park. Duddingston Loch; Lochend; Braid and Pentland Hills, &c. June. ♃.

Marsh Penny-wort. White-rot.—Stems very creeping, filiform, radicating 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.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 251.)

1. S. *europæa*, lower leaves palmate; the lobes trifid; flowers all sessile, in little pedunculate heads. *Lightf.* p. 154. *Smith*, Fl. Brit. p. 291. *Hook.* Fl. Scot. p. 87. E. B. t. 98.

HAB. Woods, common. Rosslyn and Auchindenny and Arniston Woods. Braid Hermitage; Corstorphine Hill; King's Park; Granton Woods, &c. May, June. ♃.

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 pinnatifid leaves; *Partial one*, of several lanceolate leaves. *Heads* of *flowers* whitish. *Fruit* ovate, rough, with erect scale-like hooked processes.

B. *Umbels regular.*

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

* *Umbels with a general and partial involucre.*

40. CRITHMUM.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 252.)

1. C. *maritimum*, leaves lanceolate, fleshy. *Lightf.* p. 158. *Smith*, Fl. Brit. p. 306. *Hook.* Fl. Scot. p. 89. E. B. t. 819.

HAB. Rocks by the sea-side. Said to grow on the Islands in the Frith of Forth, but not now to be found. August. ♃.

Samphire.—Stems 6–12 inches high, suberect, round, leafy. *Leaves* bi- or triternate; 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. ŒNANTHE.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 253.)

1. Œ. *fistulosa*, root creeping, stoloniferous; stem-leaves pinnate, the main petiol cylindrical, tubular. *Lightf.* p. 161. *Smith*, Fl. Brit. p. 317. *Hook.* Fl. Scot. p. 91. E. B. t. 363.

HAB. Ditches and stream-sides, rare. Between Inverkeithing and North Queensferry, Lightfoot. July, August. ♃.

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.

3. Œ. *crocata*, all the leaflets wedge-shaped, cut, nearly equal; involucre many-leaved, either linear, or broad and foliaceous. *Lightf.* p. 162. *Smith*, Fl. Brit. p. 319. *Hook.* Fl. Scot. p. 92. E. B. t. 2313.

HAB. Ditches and stream-sides. Near Limekilns, Mr Neill. River-bank near Lasswade. July. ♃.

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-

lucre. *Lightf.* p. 161. *Hook.* Fl. Scot. p. 91. E. B. t. 227. *Hydrocotyle inundata, Smith*, Fl. Brit. p. 290.

HAB. In ponds and ditches, not common. Ditches by the road-side near Auchindenny, Mr J. Stewart. Braid Hill marshes, abundant. June, July. ♂?

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.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 251.)

1. B. *Bulbocastanum*, general involucre scarcely 3-leaved; leaves tripinnate, linear, glabrous; fruit ovate. *Lightf.* p. 156. *Hook.* Fl. Scot. p. 88. B. *flexuosum*, *Smith*, Fl. Brit. p. 301. E. B. t. 988.

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 leafed, rarely wanting; partial one many-leaved. *Fruit* ovate.—The tuberous root is edible.

44. CONIUM.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 251.)

1. C. *maculatum*, stem much branched, smooth and spotted; leaves tripinnate, ultimate leaflets lanceolate, mostly subentire. *Lightf.* p. 157. *Smith*, Fl. Brit. p. 302. *Hook.* Fl. Scot. p. 88. E. B. t. 1191.

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 pinnated 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.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 251. (*Selinum.*)

1. T. *palustre*, stem somewhat angular, branched; leaves ternate and compound, leaflets opposite pinnatifid, the segments lanceolate. *Spreng.* in *Schulte's* Syst. Veg. v. 6. p. 4. 63. *Selinum palustre*, *Hook.* Fl. Scot. p. 88. *Smith*, Fl. Brit. p. 303. E. B. t. 229.

HAB. Ditches and marshes, rare. Marsh near Colinton, G. Don. July. ♃.

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. one* 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 fœtid.

46. LIGUSTICUM.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 252.)

1. L. *scoticum*, leaves bi-ternate, leaflets broadly ovate; involucres many-leaved, linear-lanceolate. *Lightf.* p. 159. *Smith*, Fl. Brit. p. 309. *Hook.* Fl. Scot. p. 89. E. B. t. 1207.

HAB. On the sea-coast, among rocks and stones, frequent. Coast of Fife between E. and W. Weems, and below Kinghorn, Lightfoot. From N. Queensferry eastward, along the whole coast, but rare on the Edinburgh side of the Frith. July. ♃.

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 *Petiol* 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.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 252.)

1. A. *sylvestris*, leaves bi-pinnate, leaflets equal, ovate, serrate, the lower ones somewhat 2-lobed at their base. *Lightf.* p. 160. *Smith*, Fl. Brit. p. 311. *Hook.* Fl. Scot. p. 90. E. B. t. 1128.

HAB. Woods and hedges, and marshy places, frequent. King's Park. Corstorphine Hill. Granton woods, &c. July. ♃.

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* involucre 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.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 252.)

1. S. *latifolium*, stem erect, channelled; lower leaves often bi-pinnate, upper ones pinnate, leaflets ovate-lanceolate, equally serrate; umbels terminal. *Lightf.* p. 1095. *Smith*, Fl. Brit. p. 312. *Hook.* Fl. Scot. p. 90. E. B. t. 204.

HAB. Ditches and pond-sides, not frequent. Duddingston Loch, Mr Yalden in Lightfoot. August. ♃.

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 pinnæ 7–9 pair, sessile, ovate-lanceolate, smooth. *Umbels* large, many-rayed, flattish. *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 acrid.

2. S. *angustifolium*, stem erect, striated; leaves pinnate, leaflets sublobed and unequally serrate; umbels pedunculate, opposite to the leaves, and terminal. *Lightf.* p. 160. *Smith*, Fl. Brit. p. 313. *Hook.* Fl. Scot. p. 90. E. B. t. 139.

HAB. Ditches and rivulets. About Edinburgh. King's Park, Mr Neill. July, August. ♃.

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.

3. S. *nodiflorum*, stem procumbent; leaves pinnate, leaflets ovate, nearly equally serrate; umbels sessile, opposite to the leaves. *Lightf.* p. 160. *Smith*, Fl. Brit. p. 313. *Hook.* Fl. Scot. p. 90. E. B. t. 639.

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.

4. S. *repens*, stem creeping, radicating; leaves pinnate, leaflets broadly ovate, cut, toothed; umbels shortly pedunculate, opposite the leaves. *Hook.* Fl. Scot. p. 90. *Smith*, Fl. Brit. p. 314. E. B. t. 1431.

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.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 252.)

1. H. *Sphondylium*, leaves pinnate, scabrous, leaflets broad, subpinnatifid, cut, serrate, the terminal one 3-lobed, and somewhat acute. *Lightf.* p. 158. *Smith*, Fl. Brit. p. 307. *Hook.* Fl. Scot. p. 89. E. B. t. 939.

β. *angustifolium*, leaves pinnate, leaflets long, linear. *H. angustifolium, Huds. Smith*, Fl. Brit. p. 307. ?

HAB. Meadows, hedges, woods, very abundant. β. Woods near Kirkliston. July. ♂.

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 *.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 253.)

1. P. *aquaticum*, leaves tripinnate, segments divaricate; peduncles of the umbels axillary. *Lightf.* p. 163. *Smith*, Fl. Brit. p. 321. *Hook.* Fl. Scot. p. 92. E. B. t. 684.

HAB. Ponds, streams and ditches, rare. Ditches near Corstorphine Hill, Mr Yalden. Mr Neill. Maughan. July. ♃.

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.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 253.)

1. *Æ. Cynapium.*
Lightf. p. 165. *Smith*, Fl. Brit. p. 323. *Hook.* Fl. Scot. p. 92. E. B. t. 1192.

HAB. Fields, cultivated grounds, &c. common. July, August. ☉.

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.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 253.)

1. C. *virosa*, lower leaves tripinnate, leaflets sub-ternate, ser-

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* This genus has been united to *Œnanthe* 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 *vittæ*.

rate; umbels opposite to the leaves. *Lightf.* p. 164. *Smith*, Fl. Brit. p. 322. *Hook.* Fl. Scot. p. 92. E. B. t. 479.

HAB. Ditches and pond-sides, rare. Lochend, Dr Parsons in Lightfoot. July, August. ♃.

Long-leaved Water-Hemlock. Cowbane.—Root large, somewhat tuberous, hollow, divided into cavities by partitions. *Stem* 3–4 feet high, erect, branched, furrowed; branches erect. *Leaves* smooth, bright green; leaflets lanceolate, acute. *Umbels* erect, on short peduncles, many-rayed. *Partial involucres* of many small, acute leaves. *Flowers* white; petals small, equal, much inflexed. *Fruit* compressed, roundish, ribbed.—Whole plant deadly poison. Lochend is the only station near Edinburgh.

53. IMPERATORIA.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 254.)

1. I. *Ostruthium*, stem nearly simple; leaves bi-ternate, leaflets ovate, unequally lobed at the base, and serrate. *Lightf.* p. 168. *Smith*, Fl. Brit. p. 327. *Hook.* Fl. Scot. p. 94. E. B. t. 1380.

HAB. Waste places. Near Borthwick Castle, Messrs Maughan and Shuter. June. ♃.

Masterwort.—Root tuberous. *Stem* erect, 1–2 feet high, slightly branched or simple, striated, smooth. *Leaves* biternate, smooth; *leaflets* broad, sharply and unequally serrate, and often 2-lobed at the base. *Umbels* many-rayed, flattish, large, terminal, very few. *Partial involucres* of several setaceous 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.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 254., under *Chærophyllum.*)

1. M. *odorata*, leaves villose, large, ternate, very compound, leaflets pinnatifid, serrate; partial involucres of 5 ciliate leaves; central florets containing only stamens. *Scandix odorata*, *Lightf.* p. 166. *Smith*, Fl. Brit. p. 323. E. B. t. 697. *Chærophyllum odoratum*, *Hook.* Fl. Scot. p. 93.

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. ♃.

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, inflexed. *Fruit* large, ¾ths 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. *Chærophyllum aureum*,

Hook, Fl. Scot. p. 94. *Smith*, Trans. Soc. Linn. v. 10. p. 339. E. B. t. 2103.

HAB. Hedges, borders of fields, very rare. Near Corstorphine, G. Don. June. ♃.

Tawny-seeded Cow-Parsley.—Stem about 3 feet high, branched, angular, striated, pubescent, the softer hairs intermixed with others which are deflexed, and of a bristly nature. *Leaves* tri-pinnate, the leaflets deeply and sharply cut; in the upper leaves very acute, in the lower ones much less so. *Umbels* flattish, many-rayed, the rays smooth. *Partial involucres* deflexed, pale, lanceolate. *Flowers* "cream-coloured," petals unequal, irregularly obcordate. *Fruit* linear-oblong, ribbed, smooth, yellowish tawny.—There is sometimes a trace of a general involucre. I have searched Don's station in vain for this plant.

55. CHÆROPHYLLUM.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 254.)

1. Ch. *sylvestre*, stem sulcate and striate, smooth, slightly swelling below the joints; leaves tri-pinnate; umbels on smooth longish peduncles, somewhat drooping before flowering. *Lightf.* p. 167. *Smith*, Fl. Brit. p. 326. *Hook.* Fl. Scot. p. 93. E. B. t. 752.

HAB. Hedges and meadows, very abundant. May, June. ♃.

Smooth Cow-Parsley.—Stem erect, branched, 3–4 feet high, pubescent towards the base; branches erect. *Leaves* large, tri-pinnate, leaflets ovate-lanceolate, deeply cut, the terminating one attenuate, especially in the upper leaves, rough at the margin. *Umbels* erect when in flower and fruit, many-rayed, on long peduncles. *Partial involucres* reflexed, membranaceous, ovate, pale, ciliate. *Flowers* white or reddish; petals unequal, radiate, obcordate. *Fruit* linear-oblong, quite smooth, with slight very obtuse ribs.

2. Ch. *temulentum*, stem rough, swelling beneath each joint; leaves bi-pinnate; rays of the umbel bristly with hairs; umbels drooping before flowering. *Lightf.* p. 167. *Smith*, Fl. Brit. p. 326. *Hook.* Fl. Scot. p. 93. E. B. t. 1521.

HAB. Fields, hedges, road-sides, very abundant. June, July. ♃.

Rough Cow-Parsley.—Stem about 3 feet high, erect, rough with hairs, striated, purplish and spotted, swollen below the joints. *Leaves* bi-pinnate, the leaflets pinnatifid, cut, hairy on both sides. *Umbels* drooping before flowering, of many rays, clothed with bristly hairs. *Partial involucres*, of many lanceolate leaves, slightly connected at their base. *Flowers* white; petals irregular, nearly equal. *Fruit* oblong, smooth, obsoletely ribbed.

** *Umbels having neither general nor partial involucres. (Carum has a general one, and Apium Petroselinum both.)*

56. APIUM.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 254.)

1. A *graveolens*, stem furrowed; leaves pinnate, those of the stem with wedge-shaped leaflets, irregularly cut; umbels often sessile. *Lightf.* p. 169. *Smith*, Fl. Brit. p. 333. *Hook.* Fl. Scot. p. 95. E. B. t. 1210.

HAB. 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 petiols, 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.

2. A. *Petroselinum* *, leaflets of the cauline leaves linear, those of the radical ones broad; umbels all pedunculate; partial involucres minute, filiform. *Hook.* Fl. Scot. p. 95. *Hull's* Brit. Fl. p. 309.

HAB. Waste places and fields. Old walls at Inverleith; on an old wall at Coltbridge; and by the road-side between 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 petiols, 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.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 254.)

1. C. *Carui.* *Lightf.* p. 169. *Smith*, Fl. Brit. p. 330. *Hook.* Fl. Scot. p. 95. E. B. t. 1503.

HAB. 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* bi-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 valleculæ or spaces between the ribs.—Seeds highly aromatic.

58. PIMPINELLA.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 254.)

1. P. *Saxifraga*, leaves pinnate; leaflets of the radical ones sub-ovate, those of the stem ones linear. *Lightf.* p. 169. *Smith*, Fl. Brit. p. 331. *Hook.* Fl. Scot. p. 95. E. B. t. 407.

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* 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 vittæ in the place of a single one. It forms the genus *Petroselinum* of Hoffman, worthy perhaps of being retained.

HAB. Dry pastures, common. King's Park, and the debris of Salisbury Craigs. July, August. ♃.

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. ÆGOPODIUM.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 255.)

1. *Æ. Podagraria* *.

Lightf. p. 170. *Smith*, Fl. Brit. p. 334. *Hook.* Fl. Scot. p. 95. E. B. t. 940.

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. ♃.

Gout-weed.—Root creeping. *Stems* erect, 1–3 feet high; furrowed, slightly branched. *Leaves; radical* ones on long petiols, 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.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 254.)

1. S. *Olusatrum*, cauline leaves ternate; leaflets large, ovate, serrate, the sheaths broad, ciliated. *Lightf.* p. 168. *Smith*, Fl. Brit. p. 328. *Hook.* Fl. Scot. p. 94. E. B. t. 230.

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. ♂.

Alexanders.—Stems erect, 3–4 feet high, stout, furrowed, pale yellow green. *Leaves* broad, shining, rather succulent; *radical* ones large, tri-ternate, on long petiols; *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, inflexed. *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.* UMBELLIFERÆ, *Hook.* Scot. (*Caucalis*) 2. p. 251.)

1. T. *Anthriscus*, scabrous; stem and branches erect; leaves

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* This genus is united to *Sison* by Sprengel; but it differs from it in important characters, besides being destitute of general and partial involucres.

bi-pinnate, leaflets oblong; umbels many-rayed; general involucre many-leaved. *Roem.* et *Schult.* v. 6. p. 482. *Caucalis Anthriscus*, *Lightf.* p. 155. *Smith*, Fl. Brit. p. 298. *Hook.* Fl. Scot. p. 87. E. B. t. 987.

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 pinnæ 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.

2. T. *nodosa*, stem scabrous; umbels simple, axillary, subsessile, clustered. *Roem.* et *Schult.* v. 6. p. 485. *Caucalis nodosa*, *Hook.* Fl. Scot. p. 88. *Smith*, Fl. Brit. p. 299. E. B. t. 199.

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 pinnæ remote from the rest. *Umbels* in the form of dense, lateral, subsessile heads or clusters, opposite to the leaves, the very short peduncle being partly embraced by the sheath of the petiol. *Involucre* 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.)

1. D. *Carota*, stem bristly; leaves tripinnate; leaflets linear-lanceolate, cut; involucre nearly as long as the rays of the umbel; fruit bristly. *Lightf.* p. 156. *Smith.* Fl. Brit. p. 300. *Hook.* Fl. Scot. p. 88. E. B. t. 1174.

HAB. Borders of fields and waste places. Road-sides about Libberton Church. Salisbury Craigs. July. ♂.

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 involucre* 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.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 253.)

1. A. *vulgaris*, stem smooth; leaves tri-pinnate, leaflets ob-

tuse; umbels mostly lateral. *Pers.* Syn. Pl. v. 1. p. 320. *Ræmur.* et *Sch.* Syst. v. 6. p. 524. *Hook.* Fl. Scot. p. 93. *Scandix Anthriscus*, *Lightf.* p. 166. *Smith*, Fl. Brit. p. 325. E. B. t. 818.

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.

(*Nat. Ord.* UMBELLIFERÆ, *Hook.* Scot. 2. p. 253.)

1. S. *Pecten*, stem rough; leaves tri-pinnate, leaflets linear, multifid; fruit roughish, with a very long beak. *S. Pecten-Veneris*, *Lightf.* p. 163. *Smith*, Fl. Brit. p. 324. *Hook.* Fl. Scot. p. 92. E. B. t. 1397.

HAB. Corn-fields, common. June, July. ☉.

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.

(*Nat. Ord.* CAPRIFOLIACEÆ, *Hook.* Scot. 2. p. 249.)

1. V. *Opulus*, leaves glabrous, lobed, widely serrate, the petiols bearing glands; cyme drooping when in fruit. *Lightf.* p. 170. *Smith*, Fl. Brit. p. 335. *Hook.* Fl. Scot. p. 96. E. B. t. 332.

HAB. Moist woods and hedges. Auchindenny woods, Maughan. June. ♄.

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. SAMBUCUS.

(*Nat. Ord.* CAPRIFOLIACEÆ, *Hook.* Scot. 2. p. 249.)

1. S. *Ebulus*, cymes with three principal branches; leaves

pinnate, leaflets lanceolate, stipules foliaceous; stem herbaceous. *Lightf.* p. 171. *Smith*, Fl. Brit. p. 336. *Hook.* Fl. Scot. p. 96. E. B. t. 475.

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, Maughan. Near Inverkeithing, Mr J. Stewart. July. ♃.

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 fœtid; cathartic.

2. S. *nigra*, cymes with five main branches; leaves pinnate, leaflets ovate; stem arborescent. *Lightf.* p. 171. *Smith*, Fl. Brit. p. 336. *Hook.* Fl. Scot. p. 96. E. B. t. 476.

HAB. Woods and hedges, frequent. June. ♄.

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 fœtid. Berries in request for making wine. Pith very useful in various electrical experiments.

IV. TETRAGYNIA.

67. PARNASSIA.

(*Nat. Ord.* VIOLACEÆ, *De Cand.* *Situation uncertain*, *Hook.* Scot. 2. p. 296.)

1. P. *palustris*.

Lightf. p. 172. *Smith*, Fl. Brit. p. 340. *Hook.* Fl. Scot. p. 96. E. B. t. 82.

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.

(*Nat. Ord.* PLUMBAGINEÆ, *Hook.* Scot. 2. p. 210.)

1. S. *Armeria*, leaves linear; scape simple, bearing a round

head of flowers. *Lightf.* p. 173. *Smith*, Fl. Brit. p. 340. *Hook.* Fl. Scot. p. 97. E. B. t. 226.

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. ♃.

Thrift.—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.)

1. L. *usitatissimum*, stem mostly solitary; leaves lanceolate, alternate; calycine leaves acute 3-nerved; petals crenate. *Lightf.* p. 173. *Smith*, Fl. Brit. p. 342. *Hook.* Fl. Scot. p. 97. E. B. t. 1357.

HAB. Corn-fields, occasionally. July. ☉.

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-nerved, 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.

2. L. *catharticum*, stem panicled above with dichotomous branches: leaves opposite, oblong; petals somewhat acute. *Lightf.* p. 174. *Smith*, Fl. Brit. p. 344. *Hook.* Fl. Scot. p. 97. E. B. t. 382.

HAB. Dry pastures, very common. King's Park. Between Burntisland and Pettycur, most abundant. June, July. ☉.

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. DROSERA.

(*Nat. Ord.* DROSERACEÆ, *Hook.* Scot. 2. p. 283.)

1. D. *rotundifolia*, leaves radical, orbicular, petiolate, spreading; scape bearing a simple raceme. *Lightf.* p. 175. *Smith*, Fl. Brit. p. 346. *Hook.* Fl. Scot. p. 98. E. B. t. 867.

HAB. Bogs. Pentland Hills, frequent. July. ♃.

Round-leaved Sun-dew.—Leaves naked beneath, covered above, and on the margin with crimson hairs, tipped with a very glutinous pellucid globule. *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.

(*Nat. Ord.* AMARYLLIDEÆ, *Hook.* Scot. 2. p. 186.)

1. G. *nivalis.*

Hook. Fl. Scot. p. 100. *Smith*, Fl. Brit. p. 352. E. B. t. 19.

HAB. Woods and banks, rare. Arniston Woods, very abundant, Messrs Maughan and Shuter. Feb. ♃.

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.

1. N. *Pseudo-Narcissus*, spatha 1-flowered; nectary infundibuliform, curled at the margin, as long as the ovate segments of the perianth. *Hook.* Fl. Scot. p. 100. *Smith*, Fl. Brit. p. 355. E. B. t. 17.

HAB. Damp woods and moist places, rare. Meadows in the neighbourhood of Culross, Maughan. April. ♃.

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.

(*Nat. Ord.* ASPHODELEÆ, *Hook.* Scot. 2. p. 184.)

1. A. *vineale*, umbel bulbiferous; leaves rounded, fistulose; stamens tricuspidate. *Lightf.* p. 179. *Smith*, Fl. Brit. p. 359. *Hook.* Fl. Scot. p. 101. E. B. t. 1974.

HAB. Dry pastures and waste banks. Debris of Salisbury Craigs, Lightfoot. Craig-Lockhart. June. ♃.

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.

2. A. *oleraceum*, umbel bulbiferous; leaves rounded, grooved above, roughish; spatha with two very long points. *Hook.* Fl. Scot. p. 101. *Smith*, Fl. Brit. p. 358. E. B. t. 488.

HAB. Borders of fields and waste places, rare. Near St David's, Mr J. Stewart. July. ♃.

Streaked Field-Garlic.—Root a small ovate brown bulb. *Stem* near 2 feet high, erect, slender, round. *Leaves* long, acute, channelled above,

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.

3. A. *ursinum*, scape triangular; leaves large, plane, oblong-lanceolate, petiolate; umbel without bulbs, flattish. *Lightf.* p. 179. *Smith*, Fl. Brit. p. 359. *Hook.* Fl. Scot. p. 101. E. B. t. 122.

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.* ASPHODELEÆ, *Hook.* Scot. 2. p. 184.)

1. O. *luteum*, flowers yellow, forming an unequal, simple umbel; stem angular, bearing two leaves below the umbel. *Lightf.* p. 180. *Smith*, Fl. Brit. p. 362. *Hook.* Fl. Scot. p. 102. E. B. t. 21.

HAB. Moist woods, very rare. Auchtertool 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; *Cauline* 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.* ASPHODELEÆ, *Hook.* Scot. 2. p. 184.)

1. H. *non-scriptus*, raceme drooping, perianth deeply sexpartite, segments revolute at their extremities; bracteas in pairs. *Lightf.* p. 182. *Hook.* Fl. Scot. p. 102. *Scilla nutans*, *Smith*, Fl. Brit. p. 366. E. B. t. 377.

HAB. Woods, hedge-banks, &c. Coryton woods, and on the south side of the river 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

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* 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.* JUNCEÆ, *Hook.* Scot. 2. p. 182.)

1. N. *Ossifragum.*

Hook. Fl. Scot. p. 103. *Smith*, Fl. Brit. p. 368. E. B. t. 535. *Anthericum ossifragum*, *Lightf.* p. 181.

HAB. Bogs on moors. Bog on the hill above North Queensferry, Mr Neill. Pentland Hills, but not frequent. July, August. ♃.

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.* ASPARAGEÆ, *Hook.* Scot. 2. p. 183.)

1. A. *officinalis*, unarmed; stem herbaceous, erect, rounded, much branched; leaves setaceous fasciculate. *Hook.* Fl. Scot. p. 103. *Smith*, Fl. Brit. p. 369. E. B. t. 339.

HAB. Sandy sea-shores, rare. Links near Gosford, Mr E. Maughan. August. ♃.

Common Asparagus.—Root creeping. *Stem* erect, 9–18 inches high, naked below and scaly, branched and bushy upwards. *Flowers* greenish white, small, monopetalous, 6-cleft, axillary, drooping on short, simple jointed peduncles. *Stamens* inserted on the corolla. *Berries* globular, bright scarlet. *Seeds* black.—The origin of our garden Asparagus. In its cultivated state it becomes much larger and more robust.

8. CONVALLARIA.

(*Nat. Ord.* ASPARAGEÆ, *Hook.* Scot. 2. p. 183.)

1. C. *majalis*, scape semicylindrical; leaves 2, ovate-lanceolate; flowers racemed, campanulate, drooping on short peduncles. *Lightf.* p. 182. *Smith*, Fl. Brit. p. 370. *Hook.* Fl. Scot. p. 103. E. B. t. 1035.

HAB. Woods in subalpine situations. Arniston and Colinton woods, Maughan. May. ♃.

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.* JUNCEÆ, *Hook.* Scot. 2. p. 179.)

* *Leaves none. Flowers lateral.*

1. J. *glaucus*, stem deeply striated, rigid; panicle much

branched, erect; capsule elliptic-acute, shorter than the acute leaves of the perianth. *Hook.* Fl. Scot. p. 105. *Smith*, Fl. Brit. p. 375. E. B. t. 665. J. *inflexus*, *Lightf.* p. 183.

HAB. Wet pastures and road-sides. Leith Links, Dr Graham. Pentland Hills, Mr Arnott. July. ♃.

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.

2. J. *effusus*, stems not rigid, finely striated; panicle lax, very compound, spreading; capsule obovate obtuse, shorter than the acute leaves of the perianth. *Lightf.* p. 183. *Smith*, Fl. Brit. p. 376. *Hook.* Fl. Scot. p. 105. E. B. t. 836.

HAB. Wet pastures and marshy places, common. July. ♃.

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.

3. J. *conglomeratus*, stem minutely striated; panicle branched, dense, globose; perianth triandrous; capsule very obtuse. *Lightf.* p. 183. *Smith*, Fl. Brit. p. 376. *Hook.* Fl. Scot. p. 105. E. B. t. 835.

HAB. Marshy places, very abundant. July. ♃.

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.*

4. J. *squarrosus*, stem naked; leaves setaceous, rigid, channelled; panicle terminal; capsules obovate. *Lightf.* p. 184. *Smith*, Fl. Brit. p. 378. *Hook.* Fl. Scot. p. 105. E. B. t. 933.

HAB. Moors and heaths, common. Braid and Pentland Hills. July. ♃.

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 scariose 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-

taceous, channelled; panicle terminal, shorter than the bractea; capsule longer than the obtuse perianth. *Lightf.* p. 184. *Smith*, Fl. Brit. p. 381. *Hook.* Fl. Scot. p. 107. E. B. t. 934.

HAB. Marshy places, frequent. By the sea-side between Granton and Cramond. August. ♃.

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 cœnosus, 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.

6. J. *bufonius*, leaves linear-setaceous; panicle dichotomous; flowers solitary, sessile; leaves of the perianth very acuminate, much longer than the capsule. *Lightf.* p. 185. *Smith*, Fl. Brit. p. 381. *Hook.* Fl. Scot. p. 108. E. B. t. 802.

HAB. Moist places; dried up ditches, &c. common. August. ☉.

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.

7. J. *uliginosus*, culm bulbous at the base, erect or prostrate; leaves setaceous, grooved; flowers 2–5 in clusters, subsessile; capsule obtuse, about as long as the dark acuminate perianth. *Hook.* Fl. Scot. p. 108. *Smith*, Fl. Brit. p. 380. E. B. t. 801.

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. ♃.

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.)*

8. J. *acutiflorus*, leaves nodoso-articulate, subcompressed; panicle terminal, variously compound; leaves of the perianth acutely lanceolate, as long as the acute capsule. *Hook.* Fl. Scot. p. 109. *J. articulatus*, *Smith*, Fl. Brit. p. 379. E. B. t. 238.

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, lanceolato-subulate, green or chocolate coloured, obsoletely 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.

9. J. *lampocarpus*, leaves nodoso-articulate, compressed; panicle terminal, compound; capsule large, black, acute, varnished, longer than the oblong-lanceolate leaves of the perianth. *Hook.* Fl. Scot. p. 109. E. B. t. 2143.

HAB. Bogs, ditches, road-sides in marshy places, frequent. Abercorn Park. July, August. ♃.

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* oblongo-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.

10. J. *obtusiflorus*, leaves rounded, nodoso-articulate; panicle very compound, spreading; leaves of the perianth concave, very obtuse, as long as the capsule. *Hook.* Fl. Scot. p. 109. E. B. t. 2144. *J. articulatus*, *Lightf.* p. 184.

HAB. Bogs and ditches, rare. Ditches in Abercorn Park near the lower fish-pond, abundant. August. ♃.

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 scariose 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.

(*Nat. Ord.* JUNCEÆ, *Hook.* Scot. p. 181.)

1. L. *maxima*, leaves hairy; panicle large, very compound, with elongated branches; leaves of the perianth aristate, as long as the capsule. *Hook.* Fl. Scot. p. 110. *Juncus sylvaticus*, *Lightf.* p. 186. *Smith*, Fl. Brit. p. 385. E. B. t. 737.

HAB. Moist woods and shaded banks, frequent. Banks of the river at Rosslyn, Dr Parsons in Lightfoot. Auchindenny woods, Colinton, Braid Hermitage, &c. May. ♃.

Great Hairy Wood-rush.—Culms 1–2 feet high, erect, leafy, striated. *Leaves* broadly linear, long, acuminate, nerved, the margin set with longish hairs; cauline 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, chesnut-coloured, with a white scariose margin. *Capsule* ovate, acute, brown.—Forms large tufts, and has a firm root.

2. L. *pilosa*, leaves hairy; panicle divaricate, slightly compound; peduncles 1-flowered, reflexed; capsule obtuse. *Hook.* Fl. Scot. p. 110. *Juncus pilosus*, *Lightf.* p. 186. *Smith*, Fl. Brit. p. 384. E. B. t. 736.

HAB. Woods, common. Rosslyn, Auchindenny, and Arniston woods, &c. April, May. ♃.

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, chesnut-coloured, shining. *Capsule* "3-sided, inversely heart-shaped, obtuse, suddenly narrower towards the middle, (*Bich.*) *Seeds* with a pale curved appendage at the top (*caruncula*), equal in length to the seeds.—Foliage resembling the preceding, but much smaller.

3. L. *campestris*, leaves hairy; spikes sessile and peduncular; leaves of the perianth lanceolate, aristate, longer than the very obtuse capsule. *Hook.* Fl. Scot. p. 110. *Juncus campestris*, *Lightf.* p. 186. *Smith*, Fl. Brit. p. 385. E. B. t. 672.

β. Culms taller; flowers collected into a dense roundish head; leaves slightly hairy. *Juncus sudeticus*, Willd.

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. ♃.

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 obtuse spikes, some of which are sessile, others pedunculate, and either erect or drooping. *Bracteas*; besides the foliaceous ones, there are several small scariose 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. β. 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. γ. is of a paler colour, and so hairy as to appear sprinkled with fine flax. It agrees so little with β., 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 β and γ are only varieties.

11. BERBERIS.

(*Nat. Ord.* BERBERIDEÆ, *Hook.* Scot. 2. p. 293.)

1. B. *vulgaris*, racemes pendulous; spines three-forked; leaves obovate, serrate, the serratures terminating in soft bristles. *Lightf.* p. 178. *Smith*, Fl. Brit. p. 387. *Hook.* Fl. Scot. p. 111. E. B. t. 49.

HAB. Hedges. Road-side near Queensferry, Mr Neill. Occasionally about Edinburgh. May, June. ♄.

Common Barberry.—A bushy shrub, with pale, erect, spinous stems. *Leaves* petiolate, smooth, fasciculate, acid to the taste. *Spines* long, very acute, divaricate. *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.

(*Nat. Ord.* SALICAREÆ, *Hook.* Scot. 2. p. 260.)

1. P. *portula*, flowers axillary, solitary, sub-apetalous; leaves obovate. *Lightf.* p. 187. *Smith*, Fl. Brit. p. 389. *Hook.* Fl. Scot. p. 111. E. B. t. 1211.

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. *Calycine segments* 12, alternately large and small. *Capsule* round, somewhat pellucid, containing numerous seeds.

III. TRIGYNIA.

13. RUMEX.

(*Nat. Ord.* POLYGONEÆ, *Hook.* Scot. 2. p. 206.)

* *Flowers all perfect (containing both stamens and pistils). Lapatha* or *Docks.*

† *Inner valves of the perianth entire.*

1. R. *crispus*, valves large, cordate, granuliferous; leaves

lanceolate, acute, waved at the margin. *Lightf.* p. 188. *Smith*, Fl. Brit. p. 391. *Hook.* Fl. Scot. p. 112. E. B. t. 1998.

HAB. Waste places, frequent. June, July. ♃.

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.

2. R. *sanguineus*, valves small, oblong, one or more granuliferous; leaves lanceolate, somewhat cordate. *Hook.* Fl. Scot. p. 112. *Smith*, Fl. Brit. p. 390. E. B. t. 1533.

HAB. Woods and waste places, rare. King's Park, Mr Neill. Abercorn woods, Maughan. Lochend, Mr J. Stewart. July. ♃.

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.*

3. R. *acutus*, valves oblong, somewhat toothed, all granuliferous; leaves cordato-oblong, acuminate; whorls leafy. *Lightf.* p. 188. *Smith*, Fl. Brit. p. 391. *Hook.* Fl. Scot. p. 112. E. B. t. 724.

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.

4. R. *obtusifolius*, valves ovate, one chiefly granuliferous; radical leaves cordate-oblong, obtuse; stem roughish. *Lightf.* p. 189. *Smith*, Fl. Brit. p. 392. *Hook.* Fl. Scot. p. 113. E. B. t. 1999.

HAB. Waste places, common. July. ♃.

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.

5. R. *maritimus*, valves triangular, bearing a tubercle, and fringed with setaceous teeth; leaves linear-lanceolate; whorls crowded. *Hook.* Fl. Scot. p. 113. *Smith*, Fl. Brit. p. 393. E. B. t. 725.

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 diœcious, (Acetosæ* or *Sorrels.)*

6. R. *Acetosa*, leaves oblong, arrow-shaped, their segments approaching the petiol. *Lightf.* p. 191. *Smith*, Fl. Brit. p. 396. *Hook.* Fl. Scot. p. 113. E. B. t. 127.

HAB. Meadows and pastures frequent. June. ♃.

Common Sorrel.—Stems erect, mostly simple, 12–20 inches high, slender, deeply striate. *Leaves; radical* ones on long petiols, 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.

7. R. *Acetosella*, leaves lanceolate, hastate, their lobes acute, spreading. *Lightf.* p. 191. *Smith*, Fl. Brit. p. 396. *Hook.* Fl. Scot. p. 113. E. B. t. 1674.

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 stameniferous ones. Herb acid like the preceding.

14. TRIGLOCHIN.

(*Nat. Ord.* JUNCAGINEÆ, *Hook.* Scot. 2. p. 192.)

1. T. *palustre*, fruit 3-celled, nearly linear. *Lightf.* p. 191. *Smith*, Fl. Brit. p. 398. *Hook.* Fl. Scot. p. 114. E. B. t. 366.

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 opening," *Hook.* When thus separated, the fruit has a strong resemblance to a 3-barbed arrow.

2. T. *maritimum*, fruit 6-celled, ovate. *Lightf.* p. 192. *Smith*, Fl. Brit. p. 399. *Hook.* Fl. Scot. p. 114. E. B. t. 255.

HAB. Salt marshes on the sea coast, abundant. Inverkeithing Bay, Mr Neill. 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.

15. ALISMA.

(*Nat. Ord.* ALISMACEÆ, *Hook.* Scot. 2. p. 186.)

1. A. *Plantago*, leaves ovate, acute; fruit depressed, the capsules obtusely triangular. *Lightf.* p. 193. *Smith*, Fl. Brit. p. 400. *Hook.* Fl. Scot. p. 114. E. B. t. 837.

HAB. Sides of streams, lakes, and ditches, very common. Lochend and Duddingston Loch, &c. July. ♃.

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.

2. A. *ranunculoides*, leaves linear-lanceolate; fruit globose, squarrose, the capsules acute. *Lightf.* p. 193. *Smith*, Fl. Brit. p. 402. *Hook.* Fl. Scot. p. 115. E. B. t. 326.

HAB. Ditches, pools, bogs, rare. Duddingston Loch, Maughan. Hunter's Bog, Mr Neill. Near Burntisland, G. Don. August. ♃.

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. *Germens* acute, 5-angled, forming a squarrose head.

VIII. OCTANDRIA.

I. MONOGYNIA.

1. EPILOBIUM.

(*Nat. Ord.* ONAGRARIÆ, *Hook.* Scot. 2. p. 258.)

* *Petals unequal.*

1. E. *angustifolium*, leaves scattered, linear-lanceolate, veined, smooth; flowers somewhat spiked, the stamens declined. *Lightf.* p. 197. *Smith*, Fl. Brit. p. 409. *Hook.* Fl. Scot. p. 116. E. B. t. 1947.

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,

hairy; stem much branched, hairy; root creeping. *Lightf.* p. 117. *Smith*, Fl. Brit. p. 410. *Hook.* Fl. Scot. p. 117. E. B. t. 838.

Hab. Sides of streams and lakes, frequent. King's Park. Abundant on the banks of the Water of Leith. July. ♃.

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.

3. E. *parviflorum*, leaves sessile, lanceolate; stem very downy; root fibrous; stigma 4-cleft. *Hook.* Fl. Scot. p. 117. *Smith*, Fl. Brit. p. 410. E. B. t. 795.

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.

4. E. *palustre*, leaves linear-lanceolate, subdentate, sessile; stem round, mostly simple; stigma undivided. *Lightf.* p. 199. *Smith*, Fl. Brit. p. 412. *Hook.* Fl. Scot. p. 117. E. B. t. 346.

Hab. Bogs and marshy places, frequent. Lochend and Duddingston Loch, abundant. Braid Hills and Pentland Hills. July. ♃.

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.

5. E. *tetragonum*, leaves lanceolate, sessile, glabrous, toothed; stem 4-angled; stigma undivided. *Lightf.* p. 198. *Smith*, Fl. Brit. p. 412. *Hook.* Fl. Scot. p. 117. E. B. t. 1948.

Hab. Sides of ditches and road-sides, not unfrequent. Colinton. July. ♃.

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.

6. E. *montanum*, leaves ovate-acute, shortly petiolate, smooth, unequally toothed; stem round; stigma shortly and obtusely 4-cleft. *Lightf.* p. 198. *Smith*, Fl. Brit. p. 411. *Hook.* Fl. Scot. p. 117. E. B. t. 1177.

Hab. Stony places, frequent. Old quarries at Corstorphine Hill. July. ♃.

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.* VACCINEÆ, *Hook.* Scot. 2. p. 231.)

1. V. *Myrtillus*, peduncles 1-flowered; leaves ovate, serrate, deciduous; stem angular. *Lightf.* p. 200. *Smith*, Fl. Brit. p. 414. *Hook.* Fl. Scot. p. 118. E. B. t. 456.

HAB. Woods, frequent. King's Park, Mr Bainbridge. Rosslyn and Auchindenny woods, abundant. May. ♄.

Bilberry, Blaeberry or *Whortle-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, shortly petiolate, smooth, veined, bright green. *Flowers* flesh-colour, axillary, solitary, pendant, 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.

2. V. *Vitis Idæa*, flowers in terminal drooping clusters; leaves evergreen, obovate, dotted beneath, subentire and revolute at the margin. *Lightf.* p. 202. *Smith*, Fl. Brit. p. 415. *Hook.* Fl. Scot. p. 118. E. B. t. 598.

HAB. Moors and woods in gravelly places. Pentland Hills, Maughan. May. ♄.

Red Whortle Berry.—A very low, little, shrubby evergreen plant. *Stems* mostly erect, 3–5 inches high, flexuose, angular. *Leaves* numerous, shortly 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.

3. V. *Oxycoccus*, peduncles 1-flowered, terminal; leaves ovate, evergreen, entire with revolute margins; stem creeping; corrolla 4-partite. *Lightf.* p. 202. *Smith*, Fl. Brit. p. 416. *Hook.* Fl. Scot. p. 119. E. B. t. 319.

HAB. Peat-bogs and marshes among moss. Pentland Hills, Mr Neill. West side of Otterston Loch, Fifeshire, Mr E. Maughan. June. ♄.

Cranberry.—Stems 6–10 inches long, filiform, creeping, radicating. *Leaves* very small, alternate, entire, glaucous beneath, on very short petiols. *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.

(*Nat. Ord.* ERICEÆ, *Hook.* Scot. 2. p. 230.)

1. E. *cinerea*, anthers with two serrated appendages at the

base; style somewhat exserted, stigma capitate; leaves ternate. *Lightf.* p. 204. *Smith*, Fl. Brit. p. 418. *Hook.* Fl. Scot. p. 119. E. B. t. 1015.

HAB. Moors and heaths, abundant. Pentland Hills, &c. July, August. ♄.

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. *Hook.* Fl. Scot. p. 119. E. B. t. 1014.

HAB. Heaths in rather moist places. Pentland Hills, &c. July, August. ♄.

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.

(*Nat. Ord.* ERICEÆ, *Hook.* Scot. 2. p. 230.)

1. C. *vulgaris.*

Hook. Fl. Scot. p. 119. *Erica vulgaris*, *Lightf.* p. 203. *Smith*, Fl. Brit. p. 417. E. B. t. 1014.

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 secund 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.* THYMELEÆ, *Hook.* Scot. 2. p. 204.)

1. D. *Laureola*, racemes clustered, axillary, of about five flowers; leaves lanceolate, glabrous, evergreen. *Lightf.* p. 205. *Smith*, Fl. Brit. p. 421. *Hook.* Fl. Scot. p. 119. E. B. t. 119.

HAB. Moist woods, rare. Rosslyn woods, Dr Parsons in Lightfoot, March. ♄.

Spurge 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.

(*Nat. Ord.* ACERACEÆ, *Hook.* Scot. 2. p. 272.)

1. A. *Pseudo-Platanus*, leaves fine-lobed, unequally serrate;

racemes pendulous. *Lightf.* p. 639. *Smith*, Fl. Brit. p. 422. *Hook.* Fl. Scot. p. 120. E. B. t. 303.

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.

2. A. *campestre*, leaves irregularly 5-lobed and cut; flowers in erect racemes. *Lightf.* p. 640. *Smith*, Fl. Brit. p. 422. *Hook.* Fl. Scot. p. 120. E. B. t. 304.

HAB. Woods and hedges, not frequent. Newbattle woods, frequent, Dr Graham. North side of Hope Park. A little wood at North Queensferry. May, June. ♄.

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.* POLYGONEÆ, *Hook.* Scot. 2. p. 205.)

* *Leaves ovate. Flowers in a single terminal spike.* (Bistorta.)

1. P. *Bistorta*, stem simple, bearing one spike; leaves ovate, the radical ones on long winged petiols. *Lightf.* p. 206. *Smith*, Fl. Brit. p. 427. *Hook.* Fl. Scot. p. 120. E. B. t. 509.

HAB. Moist meadows, rather rare. Marshy ground at Roseburn, near Coltbridge, 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 pedicels, 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.)

2. P. *amphibium*, flowers pentandrous, styles forked; spike terminal, ovate; leaves petiolate, oblong-lanceolate, rough at the margin. *Lightf.* p. 207. *Smith*, Fl. Brit. p. 423. *Hook.* Fl. Scot. p. 121. E. B. t. 436.

α. *aquaticum*, leaves broad, glabrous, floating.

β. *terrestre*, leaves narrower, rough, with short appressed hairs; stem nearly erect.

HAB. Ponds, ditches, and β on road-sides, frequent. α. On Duddingston Loch. β. On the road-side a little beyond Libberton Church. July, August. ♃.

Amphibious Persicaria.—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.

3. P. *Persicaria*, flowers hexandrous, styles forked; leaves lanceolate; spikes oblong-cylindrical, erect, with smooth peduncles; stipules fringed. *Lightf.* p. 207. *Smith*, Fl. Brit. p. 424. *Hook.* Fl. Scot. p. 121. E. B. t. 756.

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.

4. P. *lapathifolium*, flowers hexandrous, distinctly digynous; leaves broadly lanceolate, petiolate; spikes oblong-cylindrical, erect, with rough peduncles; stipules not fringed. *Hook.* Fl. Scot. p. 121. *Smith*, Fl. Brit. p. 425. E. B. t. 1382.

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.

5. P. *Hydropiper*, flowers hexandrous, the styles forked; leaves lanceolate, waved, spotless; spikes lax, filiform; stem erect. *Lightf.* p. 207. *Smith*, Fl. Brit. p. 426. *Hook.* Fl. Scot. p. 121. E. B. t. 989.

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.)

6. P. *aviculare*, leaves elliptico-lanceolate, rough at the margin, nerves of the stipules distant; stem procumbent, herbaceous. *Lightf.* p. 208. *Smith*, Fl. Brit. p. 429. *Hook.* Fl. Scot. p. 122. E. B. t. 1252.

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.)

7. P. *Convolvulus*, leaves cordate-sagittate; stem twining, angular; segments of the perianth bluntly keeled. *Lightf.* p. 208. *Smith*, Fl. Brit. p. 430. *Hook.* Fl. Scot. p. 122. E. B. t. 941.

HAB. Corn-fields, common. July, August. ☉.

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.

(*Nat. Ord.* ASPARAGEÆ, *Hook.* Scot. 2. p. 183.)

1. P. *quadrifolia* *.

Lightf. p. 208. *Smith*, Fl. Brit. p. 431. *Hook.* Fl. Scot. p. 122. E. B. t. 7.

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.* SAXIFRAGEÆ, *Hook.* Scot. 2. p. 256.)

1. A. *Moschatellina.*

Lightf. p. 209. *Smith*, Fl. Brit. p. 432. *Hook.* Fl. Scot. p. 123. E. B. t. 453.

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

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* 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.

(*Nat. Ord.* BUTOMEÆ, *Hook.* Scot. 2. p. 182.)

1. B. *umbellatus.*

Lightf. p. 211. *Smith*, Fl. Brit. p. 456. *Hook.* Fl. Scot. p. 123. E. B. t. 651.

HAB. Ponds and ditches, rare. Duddingston Loch, Mr J. Mackay. July. ♃.

Flowering Rush.—Root tuberous, horizontal. *Leaves* all radical, 2–3 feet long, erect, linear, acuminate, triquetrous. *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.

(*Nat. Ord.* MONOTROPEÆ, *Hook.* Scot. 2. p. 232.)

1. P. *rotundifolia*, leaves obovato-rotundate, slightly crenate; style bent down, much longer than the ascending stamens, the stigma with 5 erect points. *Lightf.* p. 218. *Smith*, Fl. Brit. p. 444. *Hook.* Fl. Scot. p. 127. E. B. t. 213.

HAB. Woods, rare. Auchindenny woods, Lightfoot. Rosslyn woods. July, September. ♃.

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.

gent rays. *Hook.* Fl. Scot. p. 128. *Lightf.* p. 219. *Smith,* Fl. Brit. p. 444. E. B. t. 158. *P. rosea.* E. B. t. 2543.

HAB. Woods. Woods near Ravelrig-toll, Auchindenny woods, and at Newhall, Maughan. Rosslyn woods, and woods above South Queensferry. July. ♃.

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. CHRYSOSPLENIUM.

(*Nat. Ord.* SAXIFRAGEÆ, *Hook.* Scot. 2. p. 256.)

1. C. *alternifolium*, leaves alternate. *Lightf.* p. 219. *Smith,* Fl. Brit. p. 447. *Hook.* Fl. Scot. p. 128. E. B. t. 54.

HAB. Boggy and shady places. Rosslyn woods and Bilston Burn, Maughan. St Bernard's Well, Mr J. Stewart. Newbattle woods, Dr Graham. Arniston and Auchindenny woods. March, April. ♃.

Alternate-leaved golden Saxifrage.—Root creeping. *Stem* 3–7 inches high, angular, succulent. *Leaves* numerous at the base, often on long petiols, 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.

2. C. *oppositifolium*, leaves opposite. *Lightf.* p. 220. *Smith,* Fl. Brit. p. 448. *Hook.* Fl Scot. p. 128. E. B. t. 490.

HAB. In the same situations as the last; and also in springy places on the mountains; very common. April, May. ♃.

Common golden Saxifrage.—Root creeping. *Stem* 2–4 inches high, sometimes branched. *Leaves* opposite, crowded at the base, crenate, somewhat cordate, petiolate. *Flowers* in a similar corymb to the last, mostly 4-cleft, and octandrous.—Habit in all respects similar to the last.

3. SAXIFRAGA.

(*Nat. Ord.* SAXIFRAGEÆ, *Hook.* Scot. 2. p. 255.)

* *Radical leaves undivided, or obtusely lobed.*

1. S. *umbrosa*, leaves obovate, subretuse, with cartilaginous acutely crenate margins; scape panicled; capsule superior. *Hook.* Fl. Scot. p. 129. *Smith,* Fl. Brit. p. 450. E. B. t. 663.

HAB. Woods, rare. Corstorphine Hill, Maughan. Auchindenny woods, Messrs Sommerville and Kennedy. Banks of a stream above Newbattle, Dr Graham. June, July. ♃.

London Pride.—Leaves large, numerous, spreading, smooth, all radical, and crowded, shortly petiolate. *Scape* 6–12 inches high, slender, branched, reddish, and pubescent. *Flowers* small, numerous, pale rose-colour, dotted with purple. *Petals* obovate. *Calyx* at length deflexed. *Capsule* red, superior.—A handsome plant, well known in gardens.

2. S. *granulata*, radical leaves rotundato-reniform, petiolate, obtusely lobed, cauline ones subsessile, acutely lobed; root gra-

nulated. *Lightf.* p. 224. *Smith*, Fl. Brit. p. 453. *Hook.* Fl. Scot. p. 129. E. B. t. 500.

HAB. Dry subalpine banks and pastures. Salisbury Craigs and King's Park, Lightfoot. Pentland Hills, and N. Queensferry, Mr Arnott. Braid and Blackford Hills, and at Craiglockhart. May, June. ♃.

White Saxifrage.—Root granulated, with small clustered tubers. *Stem* 2–8 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.*

3. S. *tridactylites*, lower leaves mostly trifid, the segments short, linear, upper ones mostly simple, spathulate; stem branched; petals a little longer than the calyx. *Lightf.* p. 224. *Smith*, Fl. Brit. p. 454. *Hook.* Fl. Scot. p. 130. E. B. t. 501.

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 Cockenzie; 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.

4. S. *hypnoides*, "radical leaves 3–5-cleft, those of the long sterile shoots (mostly) linear-lanceolate, acute, all nearly glabrous; flowering stem panicled." *Hook.* Fl. Scot. p. 131. *Lightf.* p. 224. *Smith*, Fl. Brit. p. 457. E. B. t. 454.

HAB. Mountains in moist rocky places. Arthur's Seat, Sir J. E. Smith. Dalmahoy Hill; Habbie's How, in the Pentland Hills, Maughan. May, June. ♃.

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 panicled, 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. *Germen* 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.

(*Nat. Ord.* ILLICIBREÆ, *Hook.* Scot. 2. p. 260.)

1. S. *annuus*, segments of the perianth erect after flowering;

leaves linear-subulate; stems slightly pubescent. *Lightf.* p. 225. *Smith*, Fl. Brit. p. 458. *Hook.* Fl. Scot. p. 133. E. B. t. 351. (A biennial variety is *S. perennis*, *Smith*, Fl. Brit. p. 458. & E. B. t. 352.)

HAB. Corn-fields and bare, sandy or gravelly places, very common. Var. β. *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. β. 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. α. in flower on a wall-top near Kincardine in May, it having survived the winter, and acquired much of the habit of β. This spring (March and April 1823), I have seen it plentifully in flower on wall-tops between Corstorphine and Kirkliston.

5. SAPONARIA.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 277.)

1. S. *officinalis*, leaves ovato-lanceolate; calyx glabrous, cylindrical. *Hook.* Fl. Scot. p. 134. *Smith*, Fl. Brit. p. 459. E. B. t. 1060.

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. ♃.

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.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 277.)

1. D. *barbatus*, flowers terminal, crowded in a fascicled manner; calycine scales ovato-subulate, as long as the tube; leaves lanceolate. *Linn.* Syst. ed. 14. p. 17. *Curt.* Bot. Mag. t. 205.

HAB. Woods. Banks of the Water of Leith between Coltbridge and Saughtonhall, Maughan. Colinton woods, Mr E. Maughan. Near Maleny, G. Don. June, July. ♃.

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 flattish 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,

lanceolate, acute ; petals notched. *Lightf.* p. 225. *Smith*, Fl. Brit. p. 462. *Hook.* Fl. Scot. p. 134. E. B. t. 61.

β, calycine scales 4 ; flowers white. *Hook.* l. c. p. 134. *Smith*, l. c. p. 462. *D. glaucus*, *Lightf.* p. 225.

HAB. Dry subalpine pastures. α. and β. in the King's Park, Lightfoot. Banks of Lochend. Blackford and Pentland Hills, Maughan. Braid Hill. July. ♃.

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.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 278.)

4. S. *inflata*, flowers more or less panicled ; calyx inflated, glabrous, veined ; leaves ovate. *Hook.* Fl. Scot. p. 134.

α. *major*, stems erect, many-flowered ; petals scarcely crowned, (*Hook.* l. c.) *Smith*, Compend. p. 68. *Cucubalus Behen*, *Lightf.* p. 226. E. B. t. 164.

β. *smaller*, stems procumbent at the base, few-flowered ; petals crowned, (*Hook.* l. c.) *Silene amœna*, *Lightf.* 227. *S. maritima*, *Smith*, Fl. Brit. p. 468. E. B. t. 957.

HAB. α. Fields and road-sides, very common. β. On rocks and among stones by the sea-side. Near Caroline Park. Pettycur and Kinghorn. North Queensferry. Islands of the Frith. June, July. ♃.

Bladder Campion.—Plant glaucous ; highly so by the sea-side. *Styles* 3–5. In α. the *stem* is 1 or 2 feet high, branched upwards in a dichotomous manner, and forming an irregular panicle. *Leaves* tufted at the base, spathulate, *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 β. 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 obcordate 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 Scotica ; but I have been compelled, unwillingly enough, to imitate that excellent naturalist, as I have altogether failed to discover a permanent specific difference.

2. S. *nutans*, flowers panicled, somewhat drooping, inclined to one side : segments of the cloven petals linear ; cauline leaves pubescent. *Hook.* Fl. Scot. p. 135. *Smith*, Fl. Brit. p. 466. E. B. t. 465.

HAB. Dry pastures and rocky places, rare. Hills near North Queensferry, Mr Mackay (Sm.), Mr Brown (Maughan). July. ♃.

Nottingham Catchfly.—Stems about a foot high, simple, erect, viscid, espe-

cially above. *Leaves* rather crowded at the base, obovate, 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.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 281.)

1. S. *Nemorum*, lower leaves petiolate, cordate, upper ones ovate, sessile; panicle dichotomous. *Lightf.* p. 228. *Smith*, Fl. Brit. p. 473. *Hook.* Fl. Scot. p. 135. E. B. t. 92.

HAB. Woods and shady places, rare. Banks of the North and South Esk, Maughan. May, June. ♃.

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.

2. S. *media*, leaves ovate; stems procumbent, with a hairy line on one side, but alternate between each joint; petals deeply bifid; stamens 5–10. *Hook.* Fl. Scot. p. 136. *Smith*, Fl. Brit. p. 473. E. B. t. 537. *Alsine media*, *Lightf.* p. 172.

HAB. Cultivated ground and waste places, very common. Almost the whole year. ☉.

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.

3. S. *holostea*, stem nearly erect, leaves lanceolate-acute, finely serrulate; petals obcordate, somewhat bifid; calycine segments nerveless. *Lightf.* p. 229. *Smith*, Fl. Brit. p. 474. *Hook.* Fl. Scot. p. 136. E. B. t. 511.

HAB. Dry banks, hedges, and woods, very frequent. May. ♃.

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.

4. S. *graminea*, stem nearly erect; leaves lanceolate-acute, entire; panicle branched, divaricate; segments of the deeply bifid petals linear; calyx 3-nerved. *Lightf.* p. 229. *Smith*, Fl. Brit. p. 475. *Hook.* Fl. Scot. p. 136. E. B. t. 803.

HAB. Fields, hedges, woods, &c., very common. May, June. ♃.

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 scariose at the margin.

5. S. *glauca*, stems erect; leaves linear-lanceolate, entire, very glaucous; flowers on long axillary or terminal peduncles; petals deeply cleft, segments oblongo-linear; calyx 3-nerved. *Hook.* Fl. Scot. p. 136. *Smith*, Fl. Brit. p. 475. E. B. t. 825.

HAB. Bogs and marshes. Lochend and Duddingston Loch, Maughan. June, July. ♃.

Glaucous Marsh Stitchwort.—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 scariose involucre, the lowest involucre 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*.

6. S. *uliginosa*, stem somewhat decumbent; leaves ovato-lanceolate, with a callous tip; flowers in irregular small panicles; petals bifid, shorter than the calyx, perigonous as well as the stamens. *Hook.* Fl. Scot. p. 136. *Smith*, Fl. Brit. p. 476. E. B. t. 1074. *S. graminea* β, *Lightf.* p. 229.

HAB. Bogs, ditches, and rivulets, common. June. ☉.

Bog Stitchwort.—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.—Differs 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.

(*Nat. Ord.* CARYOPHYLLEÆ (?), *Hook.* Scot. 2. p. 280., under *Arenaria.*)

1. A. *Peploides.*

Arenaria peploides, *Lightf.* p. 231. *Smith*, Fl. Brit. p. 477. *Hook.* Fl. Scot. p. 137. E. B. t. 189.

HAB. Sandy sea-coasts. Leith, Lightfoot. Between Newhaven and Caroline Park, very abundant. July. ♃.

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.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 280.)

* *Without stipules. Leaves ovate.*

1. A. *trinervis*, leaves ovate, acute, petiolate, mostly 3-nerved;

flowers solitary; keel of the calyx rough, obscurely 3-ribbed. *Lightf.* p. 230. *Smith*, Fl. Brit. p. 478. *Hook.* Fl. Scot. p. 137. E. B. t. 1483.

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.

2. A. *serpyllifolia*, leaves ovate, acute, subsessile, roughish; the 3 outer leaves of the hairy calyx 5-ribbed. *Lightf.* p. 230. *Smith*, Fl. Brit. p. 479. *Hook.* Fl. Scot. p. 138. E. B. t. 923.

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 membranaceous margin; the two inner ones 3-ribbed, the three outer 5-ribbed.

** *Without stipules. Leaves subulate.*

3. A. *verna*, tufted; stems panicled above; leaves subulate, rather obtuse; petals obovate, longer than the remotely 3-nerved calyx. *Lightf.* p. 231. *Smith*, Fl. Brit. p. 481. *Hook.* Fl. Scot. p. 138. E. B. t. 512. *A. laricifolia*, *Lightf.* p. 232.

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-nerved, shorter than the mature subcylindrical capsule.

4. A. *tenuifolia*, stem somewhat branched, branches supporting small panicles; leaves subulate, acute; petals lanceolate, much shorter than the acute 3-nerved calyx. *Lightf.* p. 1102. *Smith*, Fl. Brit. p. 481. *Hook.* Fl. Scot. p. 138. E. B. t. 219.

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

fleshy, tipped with a minute bristle; capsule as long as the calyx; seeds compressed, angular, roughish. *Lightf.* p. 230. *Smith*, Fl. Brit. p. 479. *Hook.* Fl. Scot. p. 138. E. B. t. 852.

HAB. Sandy fields and waste places, very common. June, July. ☉.

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.

6. A. *marina*, stems prostrate; leaves semicylindrical, fleshy, not mucronate; capsule longer than the calyx; seeds compressed, smooth, with a broad membranaceous border. *Hook.* Fl. Scot. p. 139. *Smith*, Fl. Brit. p. 480. E. B. t. 958. *A. rubra* β, *Lightf.* p. 230.

HAB. Sandy and waste places on the sea-coast, frequent. Inverkeithing, Mr Neill. Aberlady Links, abundant, Dr Graham. Queensferry. June, July. ♂.

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.

(*Nat. Ord.* SEMPERVIVÆ, *Hook.* Scot. 2. p. 282.)

* *Leaves plane.*

1. S. *Telephium*, leaves ovate, serrate; corymbs leafy; stem erect. *Lightf.* p. 234. *Smith*, Fl. Brit. p. 485. *Hook.* Fl. Scot. p. 139. E. B. t. 1319.

HAB. Borders of fields and in stony waste places, rare. Hedge-banks near Rosslyn, Maughan. Inverkeithing, Mr Arnott. July. ♃.

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.*

2. S. *dasyphyllum*, leaves of the barren stems opposite, broadly ovate, obtuse, fleshy; stem weak; panicle glutinous. *Hook.* Fl. Scot. p. 140. *Smith*, Fl. Brit. p. 486. E. B. t. 656.

HAB. Walls and rocks, rare. Colinton woods, Mr Arnott. June. ♃.

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.

3. S. *villosum*, leaves scattered, oblong, upper surface nearly plane, covered with a viscid pubescence, as well as the erect stem and panicle. *Lightf.* p. 237. *Smith*, Fl. Brit. p. 488. *Hook.* Fl. Scot. p. 140. E. B. t. 394.

HAB. Bogs and moist subalpine rocks. Pentland Hills, Dr Parsons in Lightfoot. Near Linlithgow, Sir J. E. Smith. June, July. ☉.

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.*

4. S. *acre*, leaves ovate, fleshy, gibbous, imbricate, alternate, produced at the base; cyme subtrifid, leafy. *Lightf.* p. 235. *Smith*, Fl. Brit. p. 487. *Hook.* Fl. Scot. p. 140. E. B. t. 839.

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.

5. S. *reflexum*, leaves scattered, fleshy, subulate, produced at the base; flowers somewhat cymose. *Lightf.* p. 234. *Smith*, Fl. Brit. p. 490. *Hook.* Fl. Scot. p. 141. E. B. t. 695.

HAB. Rocks, walls, and roofs, rare. Walls about Craigcrook, Maughan. Ravelston. House-tops in the village of Preston, Mr D. Stewart. July. ♃.

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.

(*Nat. Ord.* OXALIDEÆ, *Hook.* Scot. 2. p. 276.)

1. O. *Acetosella*, leaves all radical, ternate, obcordate, hairy; scape 1-flowered; root squamose. *Lightf.* p. 237. *Smith*, Fl. Brit. p. 491. *Hook.* Fl. Scot. p. 141. E. B. t. 762.

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.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 278.)

1. A. *Githago*, hairy; segments of the calyx much longer

than the corolla; petals entire, destitute of a crown. *Lightf.* p. 238. *Smith*, Fl. Brit. p. 493. *Hook.* Fl. Scot. p. 141. E. B. t. 741.

HAB. Corn-fields, extremely common. June, July. ☉.

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.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 278.)

1. L. *Flos-Cuculi*, petals 4-cleft, segments linear; capsule roundish, 1-celled. *Lightf.* p. 139. *Smith*, Fl. Brit. p. 493. *Hook.* Fl. Scot. p. 141. E. B. t. 573.

HAB. Moist meadows and pastures, very common. King's Park, &c. June, July. 4.

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 bracteas at each division. *Flowers* rose-colour, rarely white. *Calyx* and peduncles purplish red.

2. L. *Viscaria*, petals slightly notched; capsule 5-celled; stem glutinous beneath each joint. *Lightf.* p. 240. *Smith*, Fl. Brit. p. 494. *Hook.* Fl. Scot. p. 142. E. B. t. 788.

HAB. Subalpine rocks, rare. King's Park, T. Willisel in Ray. Rocks by Braid Hermitage, Sir J. E. Smith. Blackford Hill, Maughan, (probably the same as the preceding). Dundas Hill, Mr Neill. June. 4.

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.

3. L. *dioica*, flowers dicœcious; capsule 1-celled. *Lightf.* p. 240. *Smith*, Fl. Brit. p. 495. *Hook.* Fl. Scot. p. 142.

α. flowers red. E. B. t. 1579.

β. flowers white. E. B. t. 1580.

HAB. Hedges, woods, thickets, &c. very common. β, rather rare about Edinburgh; sea-side at Caroline Park, Mr Neill. May, September. 4.

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, loose panicle. *Petals* partly cleft, crowned.—The white var. becomes fragrant towards evening.

15. CERASTIUM.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 279.)

* *Petals not longer than the calyx.*

1. C. *vulgatum*, hairy, somewhat viscid, suberect; leaves

ovate obtuse; flowers subcapitate, longer than their pedicels. *Lightf.* p. 240. *Smith*, Fl. Brit. p. 496. *Hook.* Fl. Scot. p. 142. E. B. t. 789.

HAB. 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 the length of the calyx.—Plant sometimes quite destitute of viscidity.

2. C. *viscosum*, hairy, viscid, spreading; leaves oblongo-lanceolate, "flowers somewhat panicled, shorter than their pedicels;" *Hook. Lightf.* p. 240. *Smith*, Fl. Brit. p. 497. *Hook.* Fl. Scot. p. 142. E. B. t. 790.

HAB. 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.

3. C. *semidecandrum*, hairy, viscid; flowers varying between 4 and 5 stamens, and the same number of petals; fruit-bearing pedicels elongated. *Lightf.* p. 241. *Smith*, Fl. Brit. p. 497. *Hook.* Fl. Scot. p. 143. E. B. t. 1630. *C. pumilum*, *Curt.* Fl. Lond. C. *tetrandrum*, *Smith*, Fl. Brit. p. 498. *Hook.* l. c. p. 143. *Sagina cerastoides.* E. B. t. 166.

HAB. 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 spathulate. *Flowers* panicled, 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. *semidecandrum*. The earlier flowers have been observed by Mr Arnott to be almost all tetrandrous.

* *Petals longer than the calyx.*

4. C. *arvense*, leaves linear-lanceolate, more or less pubescent, especially at the base; petals twice as long as the calyx. *Lightf.* p. 241. *Smith.* Fl. Brit. p. 499. *Hook.* Fl. Scot. p. 143. E. B. t. 93.

HAB. Fields and gravelly pastures, rare. Guillon Links, Mr Arnott May, September. ♃.

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. *Calycine leaves*, ovate, obtuse. *Capsule* not longer than the calyx.

16. SPERGULA.

(*Nat. Ord.* CARYOPHYLLEÆ, *Hook.* Scot. 2. p. 279.)

1. S. *arvensis*, "leaves whorled, with minute membranaceous stipules at the base; stalk of the fruit deflexed; seeds more or less margined." *Hook.* Fl. Scot. p. 144. *Lightf.* p. 243. *Smith*, Fl. Brit. p. 502. E. B. t. 1535. S. *pentandra*, *Smith*, l. c. p. 503. E. B. t. 1536.

HAB. 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.

2. S. *nodosa*, leaves opposite, subulate, glabrous, connate, the upper ones clustered in the axils with young leaves; petals much longer than the nerveless calyx. *Lightf.* p. 224. *Smith*, Fl. Brit. p. 503. *Hook.* Fl. Scot. p. 145. E. B. t. 694.

HAB. 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. ♃.

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.* ROSACEÆ, *Hook.* Scot. 2. p. 263.)

1. A. *Eupatoria*, cauline leaves interruptedly pinnate, terminal leaflet on a petiol; fruit hispid. *Lightf.* p. 247. *Smith*, Fl. Brit. p. 511. *Hook.* Fl. Scot. p. 147. E. B. t. 1335.

HAB. Fields, waste places, and road-sides, not frequent. King's Park, Mr Bainbridge. July. ♃.

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.* RESEDACEÆ, *Hook.* Scot. 2. p. 204.)

1. R. *Luteola*, leaves lanceolate, entire, plane; calyx 4-cleft. *Lightf.* p. 248. *Smith*, Fl. Brit. p. 512. *Hook.* Fl. Scot. p. 147. E. B. t. 320.

HAB. Waste places; road-sides. About Dysart, Burntisland, and Lasswade, Lightfoot. On coal refuse between Edinburgh and Dalkeith; Craigleith; Blackford Hill, Mr Neill. Road-sides around Edinburgh. July, August. ☉.

Dyer's Weed.—Root fusiform. *Stem* 2–3 feet high, erect, taper, branched, subangular. *Leaves* alternate, glabrous, shining green. *Flowers* yellowish, very numerous, in long narrow spikes. *Stamens* numerous, hanging down. *Petals* 3, linear, the uppermost always 3-lobed. *Nectary* crenate, greenish, large, at the base of the superior petal. *Capsule* "open at the top, even before it is ripe;" *Hook.*—Used in dying yellow.

2. R. *lutea*, leaves pinnate, the upper ones with 3 segments; calyx 6-cleft. *Hook.* Fl. Scot. p. 147. *Smith*, Fl. Brit. p. 513. E. B. t. 321.

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-obovate.*

1. E. *exigua*, umbel mostly of 3 primary rays; involucella lanceolate, entire; leaves linear, or linear-lanceolate. *Lightf.* p. 250. *Smith*, Fl. Brit. p. 515. *Hook.* Fl. Scot. p. 148. E. B. t. 1336.

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 Germains, 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.

2. E. *Cyparissias*, umbel of many primary rays; involucella broadly cordate, entire; leaves linear, or linear-lanceolate, those of the sterile branches, linear-setaceous. *Hook.* Fl. Scot. p. 148. *Smith*, Fl. Brit. p. 519. E. B. t. 840.

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.

3. E. *Esula*, umbel of many primary rays; involucella broadly cordate; leaves uniform, entire, linear-obovate, or linear-oblong. *Hook.* Fl. Scot. p. 148. *Smith*, Fl. Brit. p. 518. E. B. t. 1399.

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-

nating in 2 horns. *Lightf.* p. 249. *Smith*, Fl. Brit. p. 514. *Hook.* Fl. Scot. p. 148. E. B. t. 959.

HAB. Corn-fields and waste places, frequent. Corn-fields between Edinburgh and Newhaven, plentiful. July, August. ☉.

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.

5. E. *Helioscopia*, umbel mostly of 5 primary rays; involucella broadly obovate, serrate, as well as the obovato-cuneiform leaves; nectaries roundish, entire. *Lightf.* p. 250. *Smith*, Fl. Brit. p. 516. *Hook.* Fl. Scot. p. 148. E. B. t. 883.

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. *Involucre* 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.* SEMPERVIVÆ, *Hook.* Scot. 2. p. 282.)

1. S. *Tectorum*, leaves fleshy, ciliate; offsets spreading. *Lightf.* p. 251. *Smith*, Fl. Brit. p. 522. *Hook.* Fl. Scot. p. 149. E. B. t. 1320.

HAB. On walls and house-tops. In various places about Edinburgh. July. ♃.

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 a 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 *germen*; thus exhibiting the most complete transition from stamens to germens 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,

deciduous, with 2 glands at the union of the leaf with the footstalk. *Lightf.* p. 253. *Smith*, Fl. Brit. p. 526. *Hook.* Fl. Scot. p. 150. E. B. t. 1383.

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?

2. P. *Cerasus*, flowers in subsessile umbels; leaves ovate or ovato-lanceolate, "subpubescent beneath." *Hook.* Fl. Scot. p. 150. *Smith*, Fl. Brit. p. 526. E. B. t. 706. P. *Avium*, *Lightf.* p. 254.

HAB. Woods. Banks of the Water of Leith near Woodhall, Maughan. Arniston woods. May. ♄.

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.

3. P. *domestica*, peduncles solitary, or in pairs; leaves ovato-lanceolate, "subpubescent beneath;" branches without spines. *Hook.* Fl. Scot. p. 151. *Smith*, Fl. Brit. p. 527. E. B. t. 1783.

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.

4. P. *insititia*, peduncles mostly in pairs; leaves ovato-lanceolate, pubescent beneath; branches ending in a spine. *Lightf.* p. 254. *Smith*, Fl. Brit. p. 528. *Hook.* Fl. Scot. p. 150. E. B. t. 841.

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.

5. P. *spinosa*, peduncles mostly solitary; leaves elliptico-lanceolate, glabrous beneath; branches rigid, very spinose. *Lightf.* p. 254. *Smith*, Fl. Brit. p. 528. *Hook.* Fl. Scot. p. 151. E. B. t. 842. not characteristic.

HAB. Woods and hedges, very common. April. ♄.

Sloe-tree, or *Black Thorn.*—A bushy, rigid shrub, with crooked, very spinous 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. CRATÆGUS *.

(*Nat. Ord.* ROSACEÆ, *Hook.* Scot. 2. p. 261.)

1. C. *Oxycantha*, branches spinose; leaves 3 or 5-lobed, serrate, glabrous; flowers corymbose; styles 1 or 2. *Lightf.* p. 255. *Hook.* Fl. Scot. p. 151. *Mespilus Oxycantha*, *Smith*, Fl. Brit. p. 529. E. B. t. 2504.

HAB. Woods and hedges, almost everywhere. June. ♄.

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.

(*Nat. Ord.* ROSACEÆ, *Hook.* Scot. 2. p. 261.)

1. P. *Malus*, leaves ovate, serrate; flowers in a simple sessile umbel. *Lightf.* p. 258. *Smith*, Fl. Brit. p. 531. *Hook.* Fl. Scot. p. 151. E. B. t. 179.

HAB. Woods and hedges, frequent. Rosslyn woods. May. ♄.

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.

2. P. *Aucuparia*, leaves pinnate, glabrous on both sides; flowers corymbose; styles 3–4. *Hook.* Fl. Scot. p. 151. *Smith*, Fl. Brit. p. 533. *Sorbus aucuparia*, *Lightf.* p. 256. E. B. t. 337.

HAB. Woods, frequent. Inchcolm, Mr Neill. Rosslyn, Auchindenny, Arniston, and Colinton woods. Corstorphine Hill. May, June. ♄.

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, odour 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.

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* An excellent paper on the genera of the section called POMACEÆ of the Natural Order ROSACEÆ, by Mr Lindley, will be found in Linnean Transactions, vol. xiii. p. 88.

3. P. *Aria*, leaves ovate, cut and serrate, white and downy beneath; flowers corymbose; styles 2–4. *Hook.* Fl. Scot. p. 152. *Smith*, Fl. Brit. p. 534. E. B. t. 1858. *Cratægus Aria*, *Lightf.* p. 255.

HAB. Woods, often among rocks. Rocks in the King's Park, near the Powder Magazine, Maughan. June. ♄.

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 parrallel veins. *Flowers* in a flattish corymb, white. *Petals* concave. *Fruit* scarlet, farinose, roundish oval, austere.

4. SPIRÆA.

(*Nat. Ord.* ROSACEÆ, *Hook.* Scot. 2. p. 265.)

* *Shrubby.*

1. S. *salicifolia*, leaves ovato-lanceolate, serrate, glabrous; racemes clustered, compound, terminal. *Hook.* Fl. Scot. p. 152. *Smith*, Fl. Brit. p. 535. E. B. t. 1468.

HAB. Woods. Arniston woods, Craigiehall, and Cramond Bridge, Maughan. Scarcely wild in these stations. July. ♄.

Willow-leaved Spiræa.—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. *Smith*, Fl. Brit. p. 535. *Hook.* Fl. Scot. p. 152. E. B. t. 284.

HAB. Dry stony pastures. Arthur's Seat, Lightfoot. Debris of Salisbury Craigs. July. ♃.

Common Dropwort.—Root tuberous. *Stem* a foot high, branched upwards, and terminating in a lax, erect, cymose panicle. *Leaves* pinnate, the 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.

1. S. *Ulmaria*, leaves interruptedly pinnate, serrate, pubescent beneath, the terminal leaflet largest, and lobed; principal cyme surmounted by 2 smaller ones; styles many. *Lightf.* p. 259. *Smith*, Fl. Brit. p. 536. *Hook.* Fl. Scot. p. 152. E. B. t. 960.

HAB. Moist meadows, ditch and stream-sides, very frequent. July, August. ♃.

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 proliferous manner above the first cyme; odour strong, agreeable. *Styles* 6–8.

III. POLYGYNIA.

5. ROSA *.

(*Nat. Ord.* Rosaceæ, *Hook.* Scot. 2. p. 261.)

* Pimpinellifoliæ. *Setigerous, with subuniform crowded arms, or unarmed; very rarely with bracteas. Leaflets ovate or oblong. Segments of the calyx connivent, persistent. Disk almost none.*

1. R. *spinosissima*, arms unequal; leaflets plane, without pubescence, simply serrate. *Lindl.* Monog. p. 50. *Lightf.* p. 50. *Smith*, Fl. Brit. p. 537. *Hook.* Fl. Scot. p. 154. E. B. t. 187.

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. ♄.

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; *petiols* setigerous and prickly; *leaflets* about 7, bright green, flat, simply serrated, orbicular or nearly so. *Flowers* solitary, without bracteas, cyathiform, blush-coloured; *peduncles* naked, or rough with glands or setæ, as are the *calycine segments*, which are short and entire; *tube* ovate, or nearly round, naked; *petals* emargi-

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* 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 (calycine 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.—*Lindl.*

2. R. *Sabini*, bristles few, and prickles unequal, distant; leaflets doubly serrate, tomentose; calycine segments compound. *Lindl.* Monog. p. 59. *Hook.* Fl. Scot. p. 155.

β. *Doniana*, bristles scarcely any, prickles nearly straight. R. *Doniana*, *Woods*, Linn. Trans. v. xii. p. 188.

Hab. Thickets and mountainous places. β. Banks of the Water of Leith, near Colinton, Mr Borrer. June. ♄.

Sabine's Rose.—Shrub 8–10 feet high. *Branches* erect, stout, dark brown, armed with distant falcate prickles, and a few setæ (bristles). *Leaves* grey, distant; *stipules* narrow, fringed with glands; *petiols* downy, glandular, 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; *calycine segments* compound. *Fruit* round, scarlet, hispid with bristles.—Can this be after all a production of R. *tomentosa mollis?*—*Lindl.*

** Villosæ. *Root-shoots straight. Prickles nearly so. Leaflets ovate or oblong, with diverging serratures. Calycine segments connivent, persistent. Disk incrassated, closing the mouth.*

3. R. *tomentosa*, leaflets ovate, somewhat acute; fruit hispid or naked. *Lindl.* Monog. p. 77. *Hook.* Fl. Scot. p. 156.

α. *vera*, shoots curved; calycine segments compound. R. *tomentosa*, *Smith*, Fl. Brit. p. 539. E. B. t. 990. R. *scabriuscula*, E. B. t. 1896.

β. *mollis*, shoots quite straight; calycine segments nearly simple. R. *mollis*, E. B. t. 2459.

Hab. Woods, brakes, waste places. α, Sea-side between Caroline Park and Cramond. β, Between Ravelston wood and Edinburgh, Messrs Borrer and Hooker. June. ♄.

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; *calycine 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 calycine segments; but these sometimes fall off immediately after the fruit is ripe.—*Lindl.*

*** RUBIGINOSÆ. *Prickles unequal, sometimes like bristles, rarely (if ever) wanting. Leaflets ovate or oblong, glandulose, with divergent serratures. Calycine segments persistent. Disk incrassated. Shoots curved.*

4. R. *rubiginosa*, prickles hooked; leaflets rugose, opake; calyces and peduncles hispid. *Lindl.* Monog. p. 86. *Hook.* Fl. Scot. p. 157.

α. *vulgaris*, prickles strong, very unequal; styles hairy; fruit ovate or oblong. R. *rubiginosa*, *Smith*, Fl. Brit. p. 540. E. B. t. 991. R. *suavifolia*, *Lightf.* p. 262.

β. *inodora*, prickles much hooked, nearly equal; leaflets less glandular; calycine segments deciduous before maturity. R. *dumetorum*, E. B. t. 2579.

HAB. Woods and hedges. α, Hedges about Redhall, Dr Parsons. Seaside between Carolina Park and Cramond. β, Near Edinburgh, Mr Borrer. June. ♄.

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; *petiols* 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* 30–40; *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.*

5. R. *canina*, leaflets rigid, ovate; germens 20–30. *Lindl.* Monog. p. 98. *Lightf.* p. 262. *Smith*, Fl. Brit. p. 540. *Hook.* Fl. Scot. p. 157. E. B. t. 992.

HAB. Woods and hedges, common. June. ♄.

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; *petiol* 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.*

***** SYSTILÆ. *Styles cohering in a lengthened column. Stipules adnate.*

6. R. *arvensis*, shoots flagelliform; prickles unequal, hooked; leaflets glaucous beneath. *Lindl.* Monog. p. 112. *Lightf.* p. 261. *Smith*, Fl. Brit. p. 538. *Hook.* Fl. Scot. p. 158. E. B. t. 188.

HAB. Hedges and thickets, not common. King's Park, Mr Neill. June, July. ♄.

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 red, 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.)

1. R. *idæus*, leaves pinnate; leaflets 3–5, whitish and very downy beneath; petiols channelled; stem nearly erect, prickly. *Lightf.* p. 263. *Smith*, Fl. Brit. p. 541. *Hook.* Fl. Scot. p. 159. E. B. t. 2442.

HAB. Woods, abundant. King's Park, Mr Bainbridge. Rosslyn, Auchindenny, and Arniston woods. Corstorphine Hill. June. ♄.

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, panicled, white. *Petals* small, plane. *Fruit* crimson, rendered setose from the permanent styles.—Fruit in regular request for the table.

2. R. *cæsius*, leaves ternate, hairy beneath, the lateral leaflets lobed externally; stem prickly, prostrate, glaucous; calyx embracing the fruit. *Lightf.* p. 264. *Smith*, Fl. Brit. p. 542. *Hook.* Fl. Scot. p. 160. E. B. t. 826.

HAB. Woods and hedges, &c., rare. Between Dalkeith and Pathhead, nine miles from Edinburgh, Maughan. July. ♄.

Dew-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.

3. R. *corylifolius*, leaves pinnate; leaflets 3–5, hairy beneath; stems diffuse, rounded, with nearly straight prickles. *Hook.* Fl. Scot. p. 160. *Smith*, Fl. Brit. p. 542. E. B. t. 827.

HAB. Woods and hedges. Rosslyn and Auchindenny woods. Near Craigcrook. Granton woods by the sea-side. July. ♄.

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 subsessile. *Flowers* panicled, white. *Petals* waved, concave. *Fruit* dark or blackish violet, hemispherical, the grains large. *Calyx* reflexed after flowering.

4. R. *fruticosus*, leaves pinnate; leaflets mostly 5, petiolate, hoary with pubescence beneath; stem angular, with hooked prickles on the angles. *Lightf.* p. 264. *Smith*, Fl. Brit. p. 543. *Hook.* Fl. Scot. p. 160. E. B. t. 715.

HAB. Woods and hedges, very common. July. ♄.

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.

5. R. *saxatilis*, herbaceous; leaves ternate, slightly pubescent; runners creeping; panicle few-flowered. *Lightf.* p. 265. *Smith*, Fl. Brit. p. 544. *Hook.* Fl. Scot. p. 161. E. B. t. 2233.

HAB. Moist rocky places, banks in alpine situations. Rosslyn woods, Maughan. Pentland Hills, near Colinton, Messrs Arnott and Greville. June. ♃.

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 petiols. *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.

6. R. *Chamæmorus*, herbaceous, diœcious; leaves simple, lobed; stem without prickles, 1-flowered. *Lightf.* p. 266. t. 13. *Smith*, Fl. Brit. p. 545. *Hook.* Fl. Scot. p. 161. E. B. t. 716.

HAB. Banks on the mountains. Top of the eastern Cairn Hill, one of of the Pentlands, Messrs Sommerville and E. Maughan. July. ♃.

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 subdistinct 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

appressed and sericeous beneath the calyx. *Lightf.* p. 267. *Smith*, Fl. Brit. p. 546. *Hook.* Fl. Scot. p. 162. E. B. t. 1524.

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, bracteated. *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.*

1. P. *Fragaria*, " leaflets obovate, deeply serrate, silky on each side (especially beneath); petals obcordate, as long as the calyx; stems procumbent." *Hook.* Fl. Scot. p. 164. *Fragaria sterilis*, *Lightf.* p. 268. *Smith*, Fl. Brit. p. 546. E. B. t. 1785.

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.

2. P. *Tormentilla* *, leaves ternate, sessile; leaflets lanceolate, inciso-serrate; flowers 4-petalled; stem ascending. *Sibth. Tormentilla officinalis*, *Hook.* Fl. Scot. p. 164. *Smith*, Fl. Brit. p. 552. E. B. t. 863. *T. erecta*, *Lightf.* p. 272.

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 *calycine segments* 8; but sometimes 5, and the latter 10.

** *Leaves digitate.*

3. P. *argentea*, leaves quinate; leaflets cuneiform, cut, white and downy beneath, margins revolute; stem suberect. *Lightf.* p. 270. *Smith*, Fl. Brit. p. 549. *Hook.* Fl. Scot. p. 162. E. B. t. 89.

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-

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* 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 *Potentillæ* in habit, and in every other respect, save the number of the calycine segments and petals; and these are not unfrequently of the proper number to make them *Potentillæ*. 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.

4. P. *verna*, radical leaves quinate, obovate-cuneiform, with obtuse serratures, hairy beneath; petals obcordate, longer than the calyx; stem decumbent. *Lightf.* p. 270. *Smith*, Fl. Brit. p. 550. *Hook.* Fl. Scot. p. 162. E. B. t. 37.

HAB. Rocky pastures. SW. side of Arthur's Seat, Lightfoot. Hills about North Queensferry, common, Maughan. Rocks at Craiglockhart. May, June. ♃.

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.*

5. P. *procumbens*, radical leaves quinate, petiolate, leaflets obovate-cuneiform, inciso-dentate; flowers 4-petalled; stem prostrate. *Sibth. Tormentilla reptans*, *Lightf.* p. 273. *Smith*, Fl. Brit. p. 553. *Hook.* Fl. Scot. p. 164. E. B. t. 864.

HAB. Borders of fields and waste places. Near Kirkcaldy, Mr Stewart. June, July. ♃.

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.

6. P. *reptans*, leaves quinate, obovate-obtuse, widely serrate; peduncles 1-flowered, axillary, longer than the leaves; stem filiform, creeping. *Lightf.* p. 271. *Smith*, Fl. Brit. p. 551. *Hook.* Fl. Scot. p. 163. E. B. t. 862.

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. ♃.

Common Creeping Cinquefoil.—Stems slender, long, resembling runners, radicating 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.*

7. P. *anserina*, leaves interruptedly pinnate, serrate, very silky beneath; stem creeping; peduncles axillary, 1-flowered. *Lightf.* p. 268. *Smith*, Fl. Brit. p. 547. *Hook.* Fl. Scot. p. 162. E. B. t. 861.

HAB. Moist meadows and road-sides, very common. June, July. ♃.

Silver-weed.—Stems prostrate, radicating 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.)

1. G. *urbanum*, flowers erect; awns naked; "cauline leaves ternate, radical ones lyrato-pinnate," (*Hook.*) *Lightf.* p. 273. *Smith*, Fl. Brit. p. 554. *Hook.* Fl. Scot. p. 165. E. B. t. 1400.

HAB. Woods and hedges, very common. May—August. ♃.

Common Avens.—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.

2. G. *rivale*, flowers drooping; awns feathery; radical leaves interruptedly lyrato-pinnate. *Lightf.* p. 274. *Smith*, Fl. Brit. p. 554. *Hook.* Fl. Scot. p. 165. E. B. t. 106.

HAB. Moist woods and marshy grounds, frequent. Habbie's How and Newbattle woods, Dr Graham. Rosslyn, Auchindenny, and Arniston woods. Colinton woods, &c. June, July. ♃.

Water Avens.—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*.

Lightf. p. 276. *Smith*, Fl. Brit. p. 566. *Hook.* Fl. Scot. p. 165. E. B. t. 172.

HAB. Bogs and marshes, frequent. Duddingston Loch; Braid Hill marshes; Pentland Hills, &c. July. ♃.

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 pericarps 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.

(*Nat. Ord.* PAPAVERACEÆ, *Hook.* Scot. 2. p. 292.)

1. C. *majus.*

Lightf. p. 278. *Smith*, Fl. Brit. p. 563. *Hook.* Fl. Scot. p. 167. E. B. t. 1581.

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.

(*Nat. Ord.* PAPAVERACEÆ, *Hook.* Scot. 2. p. 292.)

1. G. *luteum*, peduncles 1-flowered; cauline leaves amplexicaul, sinuate; stem glabrous. *Hook.* Fl. Scot. p. 167. *Smith*, Fl. Brit. p. 563. E. B. t. 8. *Chelidonium glaucium*, *Lightf.* p. 279.

HAB. Sea-coasts; rarely inland. Near Queensferry, Lightfoot. Near Rosythe Castle; gravelly bed of the Water of Leith, beyond Coltbridge, Mr Neill. Sandy shores near Gosford and North Queensferry, Maughan. July, August. ☉.

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.—Fœtid and poisonous.

3. PAPAVER.

(*Nat. Ord.* PAPAVERACEÆ, *Hook.* Scot. 2. p. 292.)

* *Capsules hispid.*

1. P. *Argemone*, capsule clavate, hispid; stem leafy, many-flowered. *Lightf.* p. 279. *Smith*, Fl. Brit. p. 566. *Hook* Fl. Scot. p. 168. E. B. t. 643.

HAB. Corn-fields and waste grounds. King's Park, Mr Bainbridge. Road-sides about Lasswade. June. ☉.

Long Prickly-headed Poppy.—Plant hairy. *Stem* erect, slender, branched. *Leaves* pinnate or bi-pinnate, segments narrow; *lower ones* on long petiols. *Flowers* on long peduncles, small, dull scarlet, drooping before expanding. *Petals* narrow-obovate, quickly falling. *Stamens* dilated upwards; anthers blueish.

** *Capsules glabrous.*

2. P. *dubium*, capsules glabrous, oblong; stem many-flowered,

hairy; bristles of the flower-stalks appressed; leaves pinnatifid. *Lightf.* p. 280. *Smith*, Fl. Brit. p. 567. *Hook.* Fl. Scot. p. 168. E. B. t. 644.

HAB. Corn-fields and waste ground. King's Park, Mr Bainbridge. Frequent in fields round Edinburgh. July. ☉.

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.

3. P. *Rhœas*, capsules glabrous, nearly globose; stem many-flowered, bristly, bristles all spreading; leaves pinnatifid. *Lightf.* p. 279. *Smith*, Fl. Brit. p. 567. *Hook.* Fl. Scot. p. 168. E. B. t. 645.

HAB. Corn-fields, very common. June, July. ☉.

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.

4. P. *cambricum*, capsules glabrous, oblong; stem many-flowered, subglabrous; leaves pinnate, leaflets petiolate, lobed. *Hook.* Fl. Scot. p. 168. *Smith*, Fl. Brit. p. 568. E. B. t. 66.

HAB. Moist woods, rare. Banks of the Water of Leith, near Woodhall, Messrs Sommerville and Maughan. Braid woods, Mr Arnott. June, August. ♃.

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.

4. NYMPHÆA.

(*Nat. Ord.* NYMPHÆACEÆ, *Hook.* Scot. 2. p. 292.)

1. N. *alba*, leaves cordate; calyx 4-leaved; "stigma of 16 ascending rays." *Lightf.* p. 283. *Smith*, Fl. Brit. p. 570. *Hook.* Fl. Scot. p. 169. E. B. t. 160.

HAB. Lakes and ponds. Lochend, Maughan. July. ♃.

White Water-Lily.—Plant growing in the water. *Leaves* on long petiols, floating, large. *Flowers* very large, magnificent, white. *Calycine 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 germen. The latter decays without opening.

5. NUPHAR.

(*Nat. Ord.* NYMPHÆACEÆ, *Hook.* Scot. 2. p. 293.)

1. N. *lutea*, "leaves cordate, their lobes approximate; calyx 5-leaved; stigma expanded, entire, with from 14–20 rays." *Hook.* Fl. Scot. p. 169. *Nymphæa lutea*, *Lightf.* p. 482. *Smith*, Fl. Brit. p. 569. E. B. t. 169.

HAB. Lakes and ponds. Lochend, Maughan. July. ♃.

Yellow Water-Lily.—Leaves large, floating, on long petiols. *Flowers* large, deep yellow. *Calycine leaves* large, roundish, yellow, very concave. *Pe-*

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.

(*Nat. Ord.* TILIACEÆ, *Hook.* Scot. 2. p. 273.)

1. T. *europæa*, flowers without a nectary; leaves cordate, acuminate, serrate; "pericarp ribbed, woody," *Hook. Lightf.* p. 280. *Smith*, Fl. Brit. p. 571. *Hook.* Fl. Scot. p. 170. E. B. t. 610.

HAB. Woods and hedges. Hope Park, &c. July. ♄.

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.

(*Nat. Ord.* CISTEÆ, *Hook.* Scot. 2. p. 284.)

1. H. *vulgare*, somewhat shrubby, procumbent; leaves oblong, subpilose, whitish and pubescent beneath, revolute at the margin; stipules lanceolate. *Rich.* in *Pers.* Syn. 2. p. 79. *Cistus Helianthemum*, *Lightf.* p. 280. *Smith*, Fl. Brit. p. 575. *Hook.* Fl. Scot. p. 170. E. B. t. 1321. *C. tomentosus*, E. B. t. 2208.

HAB. Dry pastures. King's Park, plentiful, Lightfoot. July, August. ♄.

Common Dwarf-Cistus.—Stems several from the same root, rather slender, 3–6 inches long. *Leaves* opposite, oblong 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 *Cisti* 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.* RANUNCULACEÆ *, *Juss.*)

1. A. *vulgaris*, spur of the petals incurved; capsules villose; stem leafy, many-flowered; leaves glabrous; styles not longer than the stamens. *De Cand. Lightf.* p. 284. *Smith*, Fl. Brit. p. 578. *Hook.* Fl. Scot. p. 170. E. B. t. 297.

HAB. Woods and moist pastures. Colinton woods, Dr Parsons in Lightfoot. June. ♃.

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* 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-ternate, petiolate; *leaflets* irregular in form, more or less divided into obtuse, roundish lobes, glaucous beneath; *cauline ones* sessile. *Flowers* large, drooping, pedunculate. *Calycine 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.

(*Nat. Ord.* HYDROCHARIDEÆ, *Hook.* Scot. 2. p. 187.)

1. S. *aloides*, leaves ensiform, somewhat triangular, serrate, the serratures prickly. *Hook.* Fl. Scot. p. 171. *Smith*, Fl. Brit. p. 579. E. B. t. 379.

HAB. Ponds and ditches, rare. Duddingston Loch, Maughan. July. ♃.

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 dicœcious.

IV. POLYGYNIA.

10. ANEMONE.

(*Nat. Ord.* RANUNCULACEÆ, *Hook.* Scot. 2. p. 294.)

1. A. *nemorosa*, leaves ternate, the segments trifid, variously cut; involucre similar, petiolate; stem 1-flowered; capsules awnless. *Lightf.* p. 284. *Smith*, Fl. Brit. p. 581. *Hook.* Fl. Scot. p. 171. E. B. t. 355.

HAB. Woods, brakes, and moist pastures, very common. April, June. ♃.

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.)

1. C. *Vitalba*, stem climbing; leaves pinnate, the leaflets cordato-ovate, inciso-lobate, acuminate; peduncles shorter than the leaves. *Hook.* Fl. Scot. p. 171. *Smith*, Fl. Brit. p. 583. E. B. t. 612.

HAB. Woods and hedges. Colinton woods, Maughan, (certainly not truly wild.) May, June. ♃.

Travellers' Joy.—Stems sarmentose, very long, much entangled, climbing by means of the twisting petiols, which act as tendrils, and do not fall

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.)

1. T. *minus*, stems glaucous; leaves tripinnate, leaflets glabrous, roundish-ovate, mostly 3-dentate, glaucous beneath; flowers panicled, drooping; "pericarps acute at each extremity." DC. *Lightf.* p. 285. *Smith*, Fl. Brit. p. 584. *Hook.* Fl. Scot. p. 172. E. B. t. 11.

HAB. Hilly pastures, and downs by the sea-side. Between Carolina Park and Cramond, G. Don. Coast west of Kirkcaldy, Messrs Arnott 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.?

HAB. Stony pastures and thickets. Hills about North Queensferry, Maughan. July. ♃.

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, capillaceo-

* 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.

multifid, floating ones tripartite, with cut lobes; petals obovate, larger than the calyx; pericarps more or less hispid. *Lightf.* p. 295. *Smith*, Fl. Brit. p. 596. *Hook.* Fl. Scot. p. 173. E. B. t. 101.

β. All the leaves submersed, divided into capillary diverging segments, forming a small orbicular outline. R. *pantothrix*, α. Decand. Syst. Veg. 1. p. 235.

γ. All the leaves submersed, divided into long capillary segments. R. *pantothrix*, γ. Decand. l. c. p. 236.

HAB. In shallow ponds and ditches, very common. β and γ in Duddingston Loch. May, June. ♃.

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 Scotica are very just on this species. R. *pantothrix* 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.

2. R. *hederaceus*, stem creeping; leaves subreniform, with 3–5 broad, entire, very obtuse, shallow lobes; petals scarcely longer than the calyx; stamens 5–12. *Lightf.* p. 294. *Hook.* Fl. Scot. p. 173. *Smith*, Fl. Brit. p. 595. E. B. t. 2003.

HAB. Ditches and marshy places, occasionally under water. Road-side near Mordun, Mr D. Stuart. King's Park, Mr Arnott. Summer. ♃

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.*

† *Leaves undivided.*

3. R. *Flammula*, leaves glabrous, linear-lanceolate, or subovate, subentire, the lower ones petiolate; stem more or less decumbent, radicating; peduncles opposite to the leaves. *Lightf.* p. 288. *Smith*, Fl. Brit. p. 587. *Hook.* Fl. Scot. p. 174. E. B. t. 387.

HAB. Bogs and marshy places, very frequent. King's Park, &c. July, August. ♃.

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* subserrate, 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. *reptans* 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.

4. R. *Lingua*, leaves lanceolate, subserrate, sessile, semi-amplexicaul; stem erect, glabrous. *Lightf.* p. 286. *Smith*, Fl. Brit. p. 588. *Hook.* Fl. Scot. p. 173. E. B. t. 100.

β. Leaves entire, and rough as well as the stem, with numerous appressed hairs.

HAB. Ditches, lake-sides. Duddingston Loch, Dr Parsons in Lightfoot. (Chiefly var. β.) July ♃.

Great Spearwort.—Stems 3–4 feet high, quite erect, stout, succulent, smooth or hairy, branched; branches erect. *Leaves* very long, linear-lanceolate, acuminate, subserrate or entire, serratures distant. *Flowers* large, very handsome.

†† *Leaves variously divided.*

† *Pericarps smooth. Root perennial.*

5. R. *auricomus*, leaves glabrous, radical ones petiolate, cordate or reniform, mostly 3-partite and lobed, cauline ones divided to the base, in linear, sub-entire segments; calyx pubescent, shorter than the petals. *Lightf.* p. 290. *Smith*, Fl. Brit. p. 590. *Hook.* Fl. Scot. p. 174. E. B. t. 624.

HAB. Woods. River-banks, opposite Lugton woods, near Dalkeith, Dr Parsons in Lightfoot. Rosslyn woods and Habbie's How, Mr Arnott. April, May. ♃.

Wood Crowfoot.—Stems a foot high or more, glabrous, slender, erect, branched. *Leaves; radical* ones shining, variously lobed and cut, on long petiols; *cauline* ones cleft to the base, in about 6 or 7 linear segments, which are entire or somewhat toothed. *Flowers* often imperfect in the petals.—Not acrid.

6. R. *sceleratus*, leaves glabrous, radical ones petiolate, 3-partite, the segments lobed, cauline ones 3-lobed; calyx subvillose; pericarps forming an oblong mass. *Lightf.* p. 201. *Smith*, Fl. Brit. p. 590. *Hook.* Fl. Scot. p. 174. E. B. t. 681.

HAB. Moist places, pond-sides, &c. Banks of Duddingston Loch, Mr Bainbridge. June. ♃.

Celery-leaved Crowfoot.—Plant glabrous. *Stem* 12–18 inches high, much branched, succulent, and often thick. *Leaves* shining; the segments of the lower ones variously lobed and cut, the upper ones often divided to the base. *Flowers* small. *Petals* roundish, spreading. *Calyx* and *peduncles* mostly villose (glabrous, *Decand.*) *Pericarps* small, very numerous.

7. R. *acris*, leaves mostly pubescent, 3-partite, the lobes deeply divided into cut segments, with acute apices; upper ones linear; stem erect, many-flowered; peduncles not furrowed; calyx spreading. *Lightf.* p. 293. *Smith*, Fl. Brit. p. 593. *Hook.* Fl. Scot. p. 175. E. B. t. 652.

HAB. Meadows and pastures, very common. June, July. ♃.

Upright Meadow-Crowfoot.—Stem 6–20 inches high, branched, round, mostly hairy; hairs appressed. *Leaves* tripartite, but appearing almost palmate from the lobes being cleft nearly to the base; segments more or less cut; *cauline* leaves divided into linear segments. *Calyx* pubescent or

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.

8. R. *repens*, leaves ternate, central leaflet petiolate, deeply 3-lobed and cut; main stems prostrate, flowering ones erect; peduncles furrowed; calyx spreading. *Lightf.* p. 292. *Smith*, Fl. Brit. p. 592. *Hook.* Fl. Scot. p. 175. E. B. t. 516.

HAB. Meadows, pastures, &c. Very abundant. June, August. ♃.

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 reflexed.

9. R. *bulbosus*, radical leaves ternate, leaflets petiolate, trifid, the segments narrow, inciso-dentate; stem erect, bulbous at the base; calyx reflexed. *Lightf.* p. 292. *Smith*, Fl. Brit. p. 591. *Hook.* Fl. Scot. p. 175. E. B. t. 515.

HAB. Pastures and waste ground, very common. May. ♃.

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.*

10. R. *hirsutus*, radical leaves ternate, or 3-lobed, leaflets trifid, cut; central one on a foot-stalk; calyx reflexed; root not bulbous; pericarps margined and tuberculate. *Hook.* Fl. Scot. p. 175. *Smith*, Fl. Brit. p. 592. E. B. t. 1504.

HAB. Pastures and waste places, not frequent. Pentland Hills, Mr Arnott. June. October. ☉.

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.)*

11. R. *arvensis*, leaves glabrous, 3-partite, each division deeply 3-cleft into linear acute segments; stem erect, many-flowered; pericarps muricate. *Lightf.* p. 294. *Smith*, Fl. Brit. p. 594. *Hook.* Fl. Scot. p. 175. E. B. t. 135.

HAB. Corn-fields, rare. Corn-field near Stockbridge, Maughan. June. ☉.

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.

(*Nat. Ord.* RANUNCULACEÆ, *Hook.* Scot. 2. p. 295. under *Ranunculus.*)

1. F. *ranunculoides*, root composed of numerous small tu-

bers; stem leafy, 1-flowered; leaves cordate. *Decand.* Syst. Veg. 1. p. 304. *Ranunculus Ficaria*, *Lightf.* p. 289. *Smith*, Fl. Brit. p. 589. *Hook.* Fl. Scot. p. 174. E. B. t. 135.

HAB. Hedge banks, woods and borders of fields, very common. April, May. ♃.

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.

(*Nat. Ord.* RANUNCULACEÆ, *Hook.* Scot. 2. p. 295.)

1. T. *europæus*, calycine leaves 15, concave, connivent; petals 5–10, as long as the stamens. *Lightf.* p. 295. *Smith*, Fl. Brit. p. 597. *Hook.* Fl. Scot. p. 176. E. B. t. 28.

HAB. Moist meadows and thickets. Banks of the Water of Leith, opposite Newmill, above Currie: Meadow-ground south of Ravelrigtoll; 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 petiols. *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.* RANUNCULACEÆ, *Hook.* Scot. 2. p. 296.)

1. C. *palustris*, stem suberect; leaves cordate, suborbicular, obtusely crenate. *Lightf.* p. 298. *Smith*, Fl. Brit. p. 599. *Hook.* Fl. Scot. p. 176. E. B. t. 506.

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. ♃.

Marsh Marigold.—Stems 3–18 inches high, stout, succulent, glabrous, sulcate, 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.* RANUNCULACEÆ, *Hook.* Scot. 2. p. 296.)

1. H. *fœtidus*, stem many-flowered, leafy; leaves pedate, glabrous, the segments oblongo-linear serrate; calyx concave, connivent. *Hook.* Fl. Scot. p. 176. *Smith*, Fl. Brit. p. 598. E. B. t. 613.

HAB. Pastures and thickets. Between Anstruther and Kepply, Mr Chalmers. April. ♃.

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.

XIV. DIDYNAMIA.

I. GYMNOSPERMIA.

1. AJUGA.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 214.)

1. A. *reptans*, glabrous; stem solitary, throwing out creeping scions. *Lightf.* p. 302. *Smith*, Fl. Brit. p. 604. *Hook.* Fl. Scot. p. 179. E. B. t. 489.

HAB. Woods and moist pastures, abundant. May, June. ♃.

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.* LABIATÆ, *Hook.* Scot. 2. p. 215.)

1. T. *Scorodonia*, leaves cordate, petiolate, pubescent, crenato-serrate; stem erect; flowers in lateral and terminal secund racemes. *Lightf.* p. 303. *Smith*, Fl. Brit. p. 606. *Hook.* Fl. Scot. p. 180. E. B. t. 1543.

HAB. Heaths, dry woods, and stony thickets. King's Park, Mr Yalden. Rosslyn woods, &c. July, August. ♃.

Wood Sage.—Root creeping. Stems erect, rigid, hairy, 4-angled, 1–2 feet high. *Leaves* opposite, very rugose. *Flowers* yellowish white, in pairs, very shortly pedicellate, leaning one way. *Lower lip* of the *corolla* long, concave. *Stamens* much exserted, red.—Plant bitter, and smelling, extremely like hops, especially when bruised.

3. MENTHA.

(*Nat. Ord.* LABIATÆ, *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.

HAB. Banks of streams, rare. Near Edinburgh, Mr Greene. September. ♃.

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

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 cordato-ovate.

** *Flowers capitate or whorled.*

2. M. *hirsuta*, flowers capitate or whorled; leaves petiolate, ovate, serrate, more or less pubescent; calyx hairy; stem and peduncles with reflexed hairs. *Lightf.* p. 104. *Hook.* Fl. Scot. p. 180. *Smith*, Fl. Brit. p. 616. E. B. t. 447. M. *aquatica*, *Lightf.* p. 305. M. *sativa*, E. B. t. 448.

HAB. Ditch and pond-sides; marshy places, very common. Duddingston Loch, several varieties. August, September. ♃.

Hairy Water-mint.—Root creeping, throwing up many stems. *Stems* 1 to near 3 feet high, 4-angled, mostly purplish, varying as well as the leaves in the degree of hairiness. *Hairs* of the *petiols* 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.

3. M. *rubra*, flowers whorled; leaves ovate, subglabrous, petiolate; stem flexuose; pedicels and lower part of the calyx smooth, the teeth hairy. *Hook.* Fl. Scot. p. 180. *Smith*, Fl. Brit. p. 619. E. B. t. 1413.

HAB. Banks of streams and ditches, rare. Musselburgh, Mr Borrer. September. ♃.

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.

4. M. *arvensis*, flowers whorled; leaves ovate, hairy, calyx campanulate, clothed with spreading hairs. *Lightf.* p. 306. *Smith*, Fl. Brit. p. 623. *Hook.* Fl. Scot. p. 181. E. B. t. 2119. M. *agrestis*, E. B. t. 2120.

HAB. Corn-fields in damp sandy or gravelly soils, frequent. Corn-fields about Craigcrook; and near Colinton. August, September. ♃.

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.

5. M. *Pulegium*, flowers whorled; leaves pubescent, ovate, obtuse; stem prostrate, pubescent; calyx and pedicels downy. *Lightf.* p. 307. *Smith*, Fl. Brit. p. 624. *Hook.* Fl. Scot. p. 181. E. B. t. 1026.

HAB. Moist waste places, near villages. Sides of springs, Pentland Hills? Lightfoot. August, September. ♃.

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.* LABIATÆ, *Hook.* Scot. 2. p. 215.)

1. G. *hederacea*, leaves reniform, crenate. *Lightf.* p. 307. *Smith*, Fl. Brit. p. 625. *Hook.* Fl. Scot. p. 181. E. B. t. 853.

HAB. Hedges and waste places, common. King's Park, Mr Yalden. April, May. ♃.

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.* LABIATÆ, *Hook.* Scot. 2. p. 216.)

1. L. *album*, leaves cordate, acuminate, with large serratures, petiolate; whorls about 20-flowered. *Lightf.* p. 308. *Smith*, Fl. Brit. p. 626. *Hook.* Fl. Scot. p. 181. E. B. t. 768.

HAB. Hedges, road-sides and waste places, frequent. King's Park, Mr Yalden. June, July. ♃.

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.

2. L. *purpureum*, leaves cordate, obtuse, crenato-serrate, the uppermost crowded together; interior of the corolla bearded at the base. *Lightf.* p. 309. *Smith*, Fl. Brit. p. 626. *Hook.* Fl. Scot. p. 182. E. B. t. 769.

HAB. Hedges, fields and waste places, abundant. May—September. ☉.

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.

3. L. *incisum*, leaves cordato-triangular, petiolate, cut, the uppermost somewhat crowded; interior of the corolla naked at the base. *Hook.* Fl. Scot. p. 182. E. B. t. 1933.

HAB. Fields and road-sides. Fields near Newhaven; and road-side between Merchiston Castle and Colinton. May, June. ☉.

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-

plexicaul, crenate or cut; lower ones petiolate. *Lightf.* p. 309. *Smith*, Fl. Brit. p. 627. *Hook.* Fl. Scot. p. 182. E. B. t. 770.

HAB. Fields, road-sides, and waste places. King's Park, Mr Yalden. Road-sides between Merchiston Castle and Colinton. April—June. ☉.

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.

6. GALEOPSIS.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 216.)

1. G. *Ladanum*, stem not swollen below the joints; leaves lanceolate, more or less serrate, hairy; upper lip of the corolla slightly crenate. *Hook.* Fl. Scot. p. 182. *Smith*, Fl. Brit. p. 628. E. B. t. 884.

HAB. Dry stony places, rare. Road-side near Oxenford Castle; and at Crossgate toll, Maughan. September, October. ☉.

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 mucronate teeth. *Flowers* whorled. *Corolla* rose-colour, with a longish tube.

2. G. *Tetrahit*, stem hispid, incrassated beneath the joints; leaves ovate, hispid, serrate; corolla twice as long as the calyx, upper lip nearly straight. *Lightf.* p. 310. *Smith*, Fl. Brit. p. 629. *Hook.* Fl. Scot. p. 182. E. B. t. 207.

HAB. Corn-fields and waste places, frequent. King's Park, Mr Yalden. August. ☉.

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.

3. G. *versicolor*, stem hispid, incrassated beneath the joints; leaves ovate, hispid, serrate; corolla thrice as long as the calyx, the upper lip ventricose. *Hook.* Fl. Scot. p. 182. *Smith*, Fl. Brit. p. 630. E. B. t. 667. G. *Tetrahit*, β, *Lightf.* p. 310.

HAB. Corn-fields. Very common about Edinburgh, Maughan. August, September. ☉.

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.

7. BETONICA.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 216.)

1. B. *officinalis*, spike interrupted, middle segment of the lower lip notched. *Lightf.* p. 311. *Smith*, Fl. Brit. p. 632. *Hook.* Fl. Scot. p. 183. E. B. t. 1142.

HAB. Woods and banks. Colinton and Auchindenny woods, Maughan. July, August. ♃.

Wood Betony.—Plant rough with hairs. *Stem* 12–18 inches high, 4-angled. *Radical leaves* on long petiols, ovate, serrate; *uppermost ones* sessile, oblong, 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.* LABIATÆ, *Hook.* Scot. 2. p. 216.)

1. S. *sylvatica*, whorls of 6 flowers; leaves cordate, acuminate, petiolate. *Lightf.* p. 312. *Smith*, Fl. Brit. p. 633. *Hook.* Fl. Scot. p. 183. E. B. t. 416.

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 fœtid.

2. S. *ambigua*, whorls of 6 flowers; leaves oblongo-cordate, petiolate; stem hollow. *Hook.* Fl. Scot. p. 183. E. B. t. 2089.

HAB. Fields and waste places, rare. Near Habbie's How, Pentland Hills, Mr Weatherhead. September. ♃.

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.

3. S. *palustris*, whorls of 6 flowers; leaves linear-lanceolate, semi-amplexicaul. *Lightf.* p. 313. *Smith*, Fl. Brit. p. 633. *Hook.* Fl. Scot. p. 183. E. B. t. 1675.

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.

4. S. *arvensis*, whorls of 6 flowers; stem weak; leaves cordato-ovate, obtuse, crenate, hairy; corolla scarcely longer than the calyx. *Lightf.* p. 313. *Smith*, Fl. Brit. p. 634. *Hook.* Fl. Scot. p. 183. E. B. t. 1154.

HAB. Corn-fields and waste places. Regent Road, Mr D. Steuart. August. ☉.

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.* LABIATÆ, *Hook.* Scot. 2. p. 217.)

1. B. *nigra*, leaves ovate, undivided, serrate; calyx campanulate, the segments broad, shortly acute. *Lightf.* p. 314. *Smith*, Fl. Brit. p. 635. *Hook.* Fl. Scot. p. 184. E. B. t. 46.

HAB. Waste places. King's Park, Mr Yalden. Same place, with white flowers, Mr D. Steuart. July, August. ♃.

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 fœtid.

10. MARRUBIUM.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 217.)

1. M. *vulgare*, stem erect; leaves roundish, ovate, toothed, rugose; calyx with 10 setaceous, uncinate teeth. *Lightf.* p. 315. *Smith*, Fl. Brit. p. 636. *Hook.* Fl. Scot. p. 184. E. B. t. 410.

HAB. Road-sides and waste places. Burntisland, Lightfoot. Fisherrow; Guillon Links; Long Niddry, Maughan. Inchcolm, Mr Neill. Road-side near Warrender House. August. ♃.

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.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 217.)

1. L. *cardiaca*, lower cauline leaves lanceolate, 3-lobed, upper ones entire. *Lightf.* p. 216. *Smith*, Fl. Brit. p. 637. *Hook.* Fl. Scot. p. 184. E. B. t. 286.

HAB. Among rubbish, and waste places. Behind Fisherrow, and in in Colinton woods, Maughan. August. ♃.

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.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 217.)

1. C. *vulgare*, leaves ovate, subserrate; whorls hairy, the pedicels branched; bracteas setaceous. *Lightf.* p. 316. *Smith*, Fl. Brit. p. 638. *Hook.* Fl. Scot. p. 184. E. B. t. 1401.

HAB. Dry waste bushy and stony places, common. Very abundant in the King's Park, Mr Yalden. Salisbury Craigs, Mr Arnott. August. ♃.

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.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 217.)

1. O. *vulgare*, spikes roundish, panicled, clustered, glabrous; bracteas ovate, longer than the calyx; leaves ovate entire. *Lightf.* p. 317. *Smith*, Fl. Brit. p. 639. *Hook.* Fl. Scot. p. 184. E. B. t. 1143.

HAB. Dry bushy or waste places. Near Burntisland by the shore; banks of the Water of Leith, Mr Neill. July, August. ♃.

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.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 217.)

1. T. *Serpyllum*, flowers capitate; stems decumbent; leaves ovate-obtuse, shortly petiolate, ciliate at the base. *Lightf.* p. 318. *Smith*, Fl. Brit. p. 639. *Hook.* Fl. Scot. p. 185. E. B. t. 1514.

HAB. Dry pastures, common. King's Park, where it also occurs with white flowers, Mr D. Steuart. July, August. ♃.

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.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 218.)

1. S. *galericulata*, leaves cordate-lanceolate, crenate; flowers axillary, in pairs. *Lightf.* p. 320. *Smith*, Fl. Brit. p. 645. *Hook.* Fl. Scot. p. 185. E. B. t. 523.

HAB. Marshes and sides of lakes. Marsh near Dundas Hill, Mr Neill. July, August. ♃.

Common Skull-cap.—Root creeping. *Stem* erect, 12–18 inches high, somewhat branched, very leafy, 5-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.

(*Nat. Ord.* LABIATÆ, *Hook.* Scot. 2. p. 218.)

1. P. *vulgaris*, leaves ovate-oblong, petiolate. *Lightf.* p. 321. *Smith*, Fl. Brit. p. 646. *Hook.* Fl. Scot. p. 185. E. B. t. 961.

HAB. Moist pastures and waste places, common. King's Park, &c. July. ♃.

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.)

1. B. *Odontites*, leaves lanceolate, floral ones alternate; flowers racemed, secund; anthers subglabrous. *Hook.* Fl. Scot. p. 186.

Smith, Fl. Brit. p. 648. E. B. t. 1415. *Euphrasia Odontites*, *Lightf.* p. 324.

HAB. Corn-fields and waste places, abundant. August, September. ⊙.

Red Bartsia.—Stem branched, erect, 4-angled, rough with deflexed hairs. *Leaves* sessile, serrate, opposite, hairy. *Flowers* red, very numerous, in terminal secund racemes. *Bracteas* narrow. *Calyx* hairy, mostly 4-cleft. *Corolla* hairy, upper lip entire, lower one 3-lobed. *Anthers* protruded, slightly hairy behind.

18. EUPHRASIA.

(*Nat. Ord.* SCROPHULARINÆ, *Hook.* Scot. 2. p. 218.)

1. E. *officinalis*, leaves ovate, deeply toothed, furrowed. *Lightf.* p. 323. *Smith*, Fl. Brit. p. 650. *Hook.* Fl. Scot. p. 186. E. B. t. 1416.

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.)

1. R. *Crista-Galli*, upper lip of the corolla arched; calyx glabrous; leaves lanceolate, serrate. *Lightf.* p. 322. *Smith*, Fl. Brit. p. 649. *Hook.* Fl. Scot. p. 186. E. B. t. 657.

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.)

1. M. *pratense*, flowers axillary, secund; leaves in distant pairs; corolla closed, 4 times as long as the calyx, the lower lip protruded. *Lightf.* p. 324. *Smith*, Fl. Brit. p. 652. *Hook.* Fl. Scot. p. 187. E. B. t. 113.

HAB. Woods and thickets. Auchindenny and Rosslyn woods, Maughan. July. ⊙.

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. LATHRÆA.

(*Nat. Ord.* OROBANCHEÆ, *Hook.* Scot. 2. p. 222.)

1. L. *squamaria*, stem simple; flowers pendulous, the lower

lip 3-cleft. *Lightf.* p. 326. *Smith*, Fl. Brit. p. 654. *Hook.* Fl. Scot. p. 187. E. B. t. 50.

HAB. Shady woods. Mavisbank, near Lasswade, Dr Parsons in Lightfoot. Arniston woods, abundant, G. Don. Woods between Auchindenny and Rosslyn, Mr E. Maughan. Banks of the Esk at Kevock Mill, Maughan. April, May. ♃.

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, racemed, 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.)

1. P. *palustris*, stem solitary, branched; calyx ovate, hairy, ribbed, 2-lobed; lobes crenate. *Lightf.* p. 326. *Smith*, Fl. Brit. p. 655. *Hook.* Fl. Scot. p. 187. E. B. t. 399.

HAB. Bogs and marshy places, frequent. At Duddingston Loch, Mr Bainbridge. Pentland Hills. July. ♂.

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.

2. P. *sylvatica*, stems several, spreading; calyx oblong, angular, glabrous, with 5 unequally notched segments. *Lightf.* p. 326. *Smith*, Fl. Brit. p. 656. *Hook.* Fl. Scot. p. 188. E. B. t. 400.

HAB. Moist pastures and heaths, frequent. Pentland Hills. July. ♃.

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.*

1. A. *Cymbalaria*, leaves broadly cordate, 5-lobed, alternate, glabrous; stems procumbent. *Hook.* Fl. Scot. p. 188. *Smith*, Fl. Brit. p. 656. E. B. t. 502.

HAB. Rocky places and old walls. New road to Portobello. Trinity Mains, Mr D. Steuart. Debris of Salisbury Craigs. June—September. ♃.

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-

cled; calyx glabrous, as long as the spur. *Hook.* Fl. Scot. p. 188. *Smith*, Fl. Brit. p. 658. E. B. t. 1253.

HAB. In waste places, rare. Banks of the Esk, above Musselburgh, Miss Ker. July—September. ♃.

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.

3. A. *Linaria*, leaves linear-lanceolate, scattered, crowded; spikes terminal, flowers imbricated; calyx glabrous, shorter than the spur. *Lightf.* p. 328. *Smith*, Fl. Brit. p. 660. *Hook.* Fl. Scot. p. 188. E. B. t. 658.

HAB. Borders of fields and waste places. Wood near the Pentland Hills, Mr Bainbridge. Between Stockbridge and Caroline Park. August. ♃.

Yellow Toad-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.)

1. S. *nodosa*, leaves cordate, acute, serrate, glabrous, not decurrent at the angles of the stem. *Lightf.* p. 329. *Smith*, Fl. Brit. p. 663. *Hook.* Fl. Scot. p. 189. E. B. t. 1544.

HAB. Moist woods, hedges, and waste places, frequent. King's Park, Mr Yalden. Inchcolm, abundant, Mr Neill. July. ♃.

Knotty-rooted Figwort.—Root knobby. *Stems* 2–3 feet high, simple, 4-angled, glabrous. *Leaves* opposite, petiolate, dark green, shining, venose. *Flowers* small, in a compound, terminal panicle, accompanied with bracteas. *Calyx* small, with 5 obtuse teeth. *Corolla* greenish-red or purple, roundish-ovate. *Capsule* ovate.—Fœtid when bruised.

2. S. *aquatica*, leaves cordate, obtuse, serrate, glabrous, decurrent, winging the angles of the stem. *Lightf.* p. 329. *Smith*, Fl. Brit. p. 663. *Hook.* Fl. Scot. p. 189. E. B. t. 2209.

HAB. Banks of ditches and watery places. Rivulet near the entrance to Hopetoun House, Mr Neill. July. ♃.

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.

3. S. *vernalis*, leaves broadly cordate, doubly serrate, pubescent; peduncles solitary, axillary, dichotomous, leafy. *Lightf.* p. 330. *Smith*, Fl. Brit. p. 664. *Hook.* Fl. Scot. p. 189. E. B. t. 567.

HAB. Waste places, rare. Old walls near Hatton, Maughan. May. ♂.

Yellow Figwort.—Stem 4, sometimes 5-angled, about 2 feet high, hairy. *Leaves* opposite, or in threes, petiolate, hairy, acute. *Axillary peduncles* many-flowered. *Flowers* yellow, furnished with bracteas. *Calyx* hairy. *Corolla* roundish, ventricose, mouth much contracted. *Capsule* ovate.

25. DIGITALIS.

(*Nat. Ord.* SCROPHULARINÆ, *Hook.* Scot. 2. p. 220.)

1. D. *purpurea*, segments of the calyx ovate, acute; upper lip of the corolla undivided; leaves downy. *Lightf.* p. 331. *Smith*, Fl. Brit. p. 665. *Hook.* Fl. Scot. p. 139. E. B. t. 1297.

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.

(*Nat. Ord.* VERBENACEÆ, *Hook.* Scot. 2. p. 213.)

1. V. *officinalis*, tetrandrous; spikes slender, panicled; leaves sublaciniate, cut; stem solitary. *Lightf.* p. 78. *Smith*, Fl. Brit. p. 608. *Hook.* Fl. Scot. p. 190. E. B. t. 767.

HAB. Waste places. Near the gates of Inverkeithing, Dr Parsons in Lightfoot. August. ♃.

Common Vervain.—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. "*Pericarp* soon disappearing, leaving the 4 really naked seeds at the bottom of the calyx;" *Hook.*

27. OROBANCHE.

(*Nat. Ord.* OROBANCHEÆ, *Hook.* Scot. p. 2. 222.)

1. O. *major*, stem simple; corolla tubular, upper lip entire, lower one subequally 3-lobed; stamens glabrous; style downy. *Lightf.* p. 332. *Smith*, Fl. Brit. p. 669. *Hook.* Fl. Scot. p. 190. E. B. t. 421.

HAB. Dry pastures, rare. Near Burntisland, Sibbald. June, July. ♃.?

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.

2. O. *rubra*, stem simple; corolla tubular, upper lip 2-lobed, lower one equally 3-lobed, lobes obtuse; stamens partially glanduloso-pilose; style glabrous. *Hook.* Fl. Scot. p. 191., and Fl. Lond. New Series, t. 105. (good.) E. B. t. 1786. (bad.)

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.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 286.)

1. C. *maritima*, articulations of the silicula 2-edged, the upper one sagittate; leaves pinnatifid, subdentate, fleshy. *Br. Hook.* Fl. Scot. p. 193. *Bunias Cakile*, *Lightf.* p. 363. *Smith*, Fl. Brit. p. 694. E. B. t. 231.

HAB. Sandy sea-coasts. Leith sands, Lightfoot. Coast at Caroline Park, &c. June, August. ⊙.

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 *.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 286.)

1. C. *Ruellii*, silicula undivided, crested with little sharp points. *Br. Hook.* Fl. Scot. p. 193. *Smith*, Fl. Brit. p. 690. E. B. t. 1660. *Cochlearia Coronopus*, *Lightf.* p. 345.

HAB. Waste places, not common. Burntisland and Seton Harbour, Maughan. Musselburgh, Mr Arnott. August. ⊙.

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.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 286.)

1. T. *arvense*, leaves sagittate, oblong, toothed, glabrous, silicula obovate-orbicular, its wings dilated longitudinally. *Lightf.* p. 340. *Smith*, Fl. Brit. p. 683. *Hook.* Fl. Scot. p. 194. E. B. t. 1659.

HAB. Corn-fields and waste places, rather rare. Corn-fields about Edin-

* This forms a part of the genus *Senebiera* 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.

2. T. *Bursa-Pastoris*, silicula obcordate, without wings; radical leaves pinnatifid. *Br. Lightf.* p. 342. *Smith*, Fl. Brit. p. 687. *Hook.* Fl. Scot. p. 194. E. B. t. 1485.

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 siliculæ are constant.

4. LEPIDIUM.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 286.)

1. L. *latifolium*, silicula ovate, pointed with the stigma; leaves ovate-lanceolate, undivided, subserrate, the lower ones on long petiols. *DC. Lightf.* p. 338. *Smith*, Fl. Brit. p. 682. *Hook.* Fl. Scot. p. 194. E. B. t. 182.

HAB. On the sea-coast, rare. By Weems Castle, Fifeshire, Lightfoot. July. ♃.

Broad-leaved Pepperwort.—Glabrous. *Stem* 2–3 feet high, erect, branched. *Leaves* sessile upwards, entire or subdentate, 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* obovate, longer than the calyx.

2. L. *hirtum*, silicula ovate, winged, emarginate, glabrous (hairy, *DC.*); cauline leaves sagittate, villose, subdentate. *Hook.* Fl. Scot. p. 195. *Thlaspi hirtum*, *Smith*, Fl. Brit. p. 684. E. B. t. 1803.

HAB. Woods, fields, road-sides, rare. Woods near Rosslyn, G. Don. Corn-field at Bellsmills, Mr E. Maughan. June. ♂.

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 siliculæ are glabrous.

5. COCHLEARIA.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 287.)

1. C. *officinalis*, silicula ovato-globose, half the length of the pedicel; radical leaves petiolate, cordate, cauline ones sessile, ovate, angulato-dentate. *Lightf.* p. 342. *Smith*, Fl. Brit. p. 688. *Hook.* Fl. Scot. p. 195. E. B. t. 551.

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.

2. C. *Danica*, silicula ovato-elliptical, as long as the pedicel; leaves deltoid, all petiolate. *Lightf.* p. 343. *Smith*, Fl. Brit. p. 689. *Hook.* Fl. Scot. p. 196. E. B. t. 696.

HAB. Barren stony places on the sea-coast. Burntisland and Cramond Island in the Frith of Forth, Maughan. May. ⊙.

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. *Siliculæ* reticulated with veins, tipped with a very short style.

3. C. *Armoracia*, silicula ovato-elliptical; radical leaves oblong, crenate, cauline ones elongato-lanceolate, inciso-dentate; root very large, carnose. *Lightf.* p. 1136. *Smith*, Fl. Brit. p. 690. *Hook.* Fl. Scot. p. 196. E. B. t. 2323.

HAB. Waste places, rare. Field near Craigcrook, Maughan. Duddingston Loch, Mr Arnott. May. ♃.

Horse-Radish.—Root large, white, thick, long, very pungent to the taste. *Stem* 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. *Siliculæ* compressed, often not perfecting seeds, tipped with a very short style, the stigma dilated.—Root in constant use for the table.

6. SUBULARIA.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 287.)

1. S. *aquatica*.

Lightf. p. 337. *Smith*, Fl. Brit. p. 676. *Hook.* Fl. Scot. p. 196. E. B. t. 732.

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. *Siliculæ* ovato-elliptical, tipped with the sessile roundish stigma.

7. DRABA.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 287.)

1. D. *verna* *, scapes naked; petals bipartite; leaves lanceolate, somewhat cut, hairy. *Br. Lightf.* p. 336. *Smith*, Fl. Brit. p. 677. *Hook.* Fl. Scot. p. 196. E. B. t. 587.

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. *Siliculæ* rather distant, elliptical, compressed, glabrous.

2. D. *muralis*, stem branched; leaves ovate, obtuse, amplexicaul, dentate; silicula patent, glabrous. *Br. Hook.* Fl. Scot. p. 197. *Smith*, Fl. Brit. p. 679. E. B. t. 912.

HAB. Walls. Field behind the old Botanic Garden; Bellevue, G. Don. (Certainly not indigenous, about Edinburgh at least.) May. ☉.

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. *Siliculæ* half the length of the pedicels, obovate-oblong, glabrous.

8. CAMELINA.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 288.)

1. C. *sativa*, silicula obovato-pyriform, marginate, tipped with the pointed style; leaves subentire, lanceolate, sagittate. *Hook.* Fl. Scot. p. 198. *Myagrum sativum*, *Lightf.* p. 336. *Alyssum sativum*, *Smith*, Fl. Brit. p. 679. E. B. t. 1254.

HAB. Fields and waste places, rare. Near Inverkeithing, Mr J. Stewart. Calton Hill, Mr D. Steuart. June, July. ☉.

Gold of Pleasure.—Stem about 2 feet high, rounded, branched upwards in a panicled manner. *Leaves* roughish, embracing the stem with their sagittate base. *Flowers* numerous, in corymbs at first, afterward racemed, small, yellow. *Siliculæ* on long pedicels, curved upwards, mucronate with the pointed style.

II. SILIQUOSA.

9. CARDAMINE.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 288.)

1. C. *amara*, leaves pinnate, leaflets of the radical ones roundish, those of the cauline ones dentato-angulate; stigma acute; stem radicating at the base. *Lightf.* p. 350. *Smith*, Fl. Brit. p. 699. *Hook.* Fl. Scot. p. 198. E. B. t. 1000.

HAB. Stream-sides and wet meadows. St Bernard's Well, Lightfoot. Near Bellsmills and Kevock-Mill, Maughan. Rosslyn woods, Mr Arnott. Banks of the Esk above Dalkeith, Dr Graham. April—June. ♃.

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. *Siliqua* linear, about an inch long.

2. C. *pratensis*, leaves pinnate, leaflets of the radical ones roundish, those of the stem ones linear-lanceolate, subentire; stigma capitate. *Lightf.* p. 349. *Smith*, Fl. Brit. p. 699. *Hook.* Fl. Scot. p. 198. E. B. t. 776.

HAB. Moist meadows, very common. May. ♃.

Common Lady's Smock.—Stem a foot high or more, mostly erect. *Leaves*

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. *Siliquæ* linear, near an inch long. *Stigma* capitate.—Flower sometimes double in the wild state.

3. C. *hirsuta*, leaves pinnate, leaflets of the radical ones roundish and petiolate, those of the upper ones oblong, subsessile; petals oblong; siliquæ erect. *Lightf.* p. 348. *Smith*, Fl. Brit. p. 698. *Hook.* Fl. Scot. p. 199. E. B. t. 492. *C. parviflora*, *Lightf.* l. c. p 1104.

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. *Siliquæ* filiform, glabrous or somewhat pilose.

10. ARABIS.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 288.)

1. A. *Thaliana*, leaves subdentate, pilose, the radical ones petiolate, ovate-oblong; stem branched; stamens as long as the petals; siliquæ suberect, on longish pedicels. *Lightf.* p. 358. *Smith*, Fl. Brit. p. 712. *Hook.* Fl. Scot. p. 199. E. B. t. 901.

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. *Siliquæ* slender, ascending, a little longer than the filiform pedicels.

2. A. *hirsuta*, leaves dentate, scabrous, the radical ones obovate, petiolate; cauline ones ovate-lanceolate, semiamplexicaul; flowering pedicel as long as the calyx; siliquæ erect. *Hook.* Fl. Scot. p. 200. *Turritis hirsuta*, *Lightf.* p. 358. *Smith*, Fl. Brit. p. 716. E. B. t. 587.

HAB. Dry rocks and waste places. King's Park, Lightfoot. Habbie's How in the Pentland Hills, Maughan. June. ♂.

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. *Siliquæ* numerous, an inch long, linear, straight, erect, compressed. *Stigma* subsessile.

11. BARBAREA.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 289.)

1. B. *vulgaris*, lower leaves lyrate, the terminal lobe round-

ish, upper ones obovate, toothed. *Hook.* Fl. Scot. p. 200. *Erysimum Barbarea, Lightf.* p. 355. *Smith*, Fl. Brit. p. 706. E. B. t. 443.

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 corymbose head, which elongates to a raceme. *Siliquæ* half an inch long, erecto-patent.—Plant bitter, nauseous and mucilaginous, according to Smith.

2. B. *præcox*, lower leaves lyrate, the terminal lobe ovate, the upper ones pinnatifid, the lobes linear-oblong, entire. *Hook.* Fl. Scot. p. 201. *Erysimum præcox, Smith*, Fl. Brit. p. 707. E. B. t. 1129.

HAB. Moist places. St Bernard's Well, Mr J. Stewart. May,—September. ♂.

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. *Siliquæ* near thrice as long as the preceding.

12. NASTURTIUM.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 289.)

1. N. *officinale*, leaves pinnate, leaflets ovate, subcordate, sinuato-dentate. *Hook.* Fl. Scot. p. 201. *Sisymbrium Nasturtium, Lightf.* p. 350. *Smith*, Fl. Brit. p. 700. E. B. t. 855.

HAB. Brooks and ditches, very common. King's Park, Mr Yalden. July. ♃.

Water-Cress.—Stems decumbent, and floating if in deeper water, radicating 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 racemed. *Siliquæ* scarcely an inch long, forming an ascending angle with the patent pedicels.—Esteemed as a salad.

2. N. *palustre*, leaves lyrato-pinnatifid, lobes confluent, unequally toothed, glabrous; petals not longer than the calyx. *Decand.* Syst. Veg. v. 2. p. 191. N. *terrestre, Hook.* Fl. Scot. p. 201. *Sisymb. amphibium a Lightf.* p. 352. S. *terrestre, Smith*, Fl. Brit. p. 701. E. B. t. 1747.

HAB. Marshes and borders of lakes. Figget Whins, G. Don. Kinghorn Loch, Mr Neill. June,—September. ☉.

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. *Siliquæ* short, turgid; pedicels as long as the siliquæ, patent.

3. N. *amphibium*, leaves oblong-lanceolate, pinnatifid or serrate; root fibrous, petals longer than the calyx; siliculæ ellip-

tical. *Hook.* Fl. Scot. p. 201. *Sisymbrium amphibium*, β. *Lightf.* p. 352. S. *amphibium*, *Smith*, Fl. Brit. p. 702. E. B. t. 1840.

HAB. Margins of lakes and wet places. Duddingston Loch, Mr Yalden. July, August. ♃.

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. *Siliculæ* in elongated racemes, short, oblong-elliptical, tipped with the filiform style: pedicels patent, at length subreflexed, twice as long as the siliculæ.—A very variable plant in the character of the leaves *.

13. SISYMBRIUM.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 289.)

1. S. *officinale*, leaves runcinate, hairy, as well as the stem; siliquæ subulate, pressed to the main stalk. *Hook.* Fl. Scot. p. 202. *Erysimum officinale*, *Lightf.* p. 354. *Smith*, Fl. Brit. p. 706. E. B. t. 735.

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 *Siliquæ* erect, appressed, the former very short; the latter about half an inch long.

2. S. *Sophia*, leaves bipinnate, the segments oblong-linear, cut; petals shorter than the calyx; calyx thrice as short as its pedicel. *Lightf.* p. 354. *Smith*, Fl. Brit. p. 704. *Hook.* Fl. Scot. p. 202. E. B. t. 963.

HAB. Waste places. Road-side from Canonmills to Trinity. Gosford Links. Musselburgh, Mr Arnott. August. ☉.

Flix-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. *Siliquæ* linear, near an inch long, erect: pedicels erecto-patent, filiform, one-third of the length of the siliquæ.

14. CHEIRANTHUS.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 290.)

1. C. *Cheiri*, leaves lanceolate, acute, hoary beneath; pubescent, bipartite and close pressed, or wanting; siliquæ linear; stigma with recurved lobes. *Lightf.* p. 357. C. *fruticulosus*, *Smith*, Fl. Brit. p. 709. *Hook.* Fl. Scot. p. 202. E. B. t. 1934.

HAB. Old walls and ruins. King's Park, Mr Yalden. On Salisbury

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* Decandolle has, besides the common appearance, two varieties, which may be met with probably in this country.

α. *indivisum*, all the leaves nearly entire or serrate.

β. *variifolium*, some of the leaves serrate, some pectinato-pinnatifid, others capillaceo-multifid. This I have received from Canada, from Dr Holmes.

craigs, abundant, (recently introduced), Mr D. Stuart. Rosslyn Castle, plentiful. May. ♃.

Wild Wall-flower.—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. *Siliquæ* suberect, straightish, about an inch long.—Very fragrant. Several varieties cultivated in gardens.

15. HESPERIS.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 290.)

1. H. *matronalis*, pedicels as long as the calyx; petals obovate; *siliqua* erect, torulose, glabrous, not thickened at the margin; leaves ovate-lanceolate, toothed; stem erect. *Lightf.* p. 1136. *Hook.* Fl. Scot. p. 202. H. *inodora*, *Smith*, Fl. Brit. p. 711. E. B. t. 731.

HAB. Waste shady places. Banks of Glencorse, Lightfoot. Colinton and Auchindenny woods, Maughan. Bank below Arthur's Seat, Mr Arnott. Water of Leith, Mr J. Stewart. May, June. ♂.

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.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 290.)

1. B. *Napus*, leaves glabrous, glaucous, the radical ones lyrate, toothed, the uppermost ones cordato-lanceolate, amplexicaul; root fusiform. *Lightf.* p. 359. *Smith*, Fl. Brit. p. 719. *Hook.* Fl. Scot. p. 203. E. B. t. 2146.

HAB. Corn-fields and waste places. Rocks behind Edinburgh Castle, Dr Parsons. June. ♂.

Wild Navew 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. *Siliquæ* erecto-patent, straight, torulose, longer than the pedicels; raceme long.—Oil is expressed from the seeds.

2. B. *Rapa*, radical leaves lyrate, setoso-scabrous, upper cauline ones nearly entire, glabrous; root caulescent, orbicular. *Hook.* Fl. Scot. p. 203. *Smith*, Fl. Brit. p. 719. E. B. t. 2176.

HAB. Borders of fields. Behind Edinburgh Castle, Dr Graham. April, May. ♂.

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. *Siliquæ* 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,

glabrous, waved and lobed; root caulescent. *Hook.* Fl. Scot. p. 203. *Smith*, Fl. Brit. p. 720. E. B. t. 637.

HAB. Marine banks and rocks, Inchkeith, G. Don. Inchcolm, 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. *Petals* obovate, lax. *Siliquæ* erect, torulose an inch long.

4. B. *campestris*, leaves glaucous, somewhat fleshy, lower ones lyrate, dentate, subhispid, upper ones cordate, acuminate, amplexicaul. *Hook.* Fl. Scot. p. 203. *Smith*, Fl. Brit. p. 718. E. B. t. 2234.

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. *Siliquæ* in a raceme, about an inch long, somewhat torulose, obsoletely 4-sided, tipped with the subulate style.

17. SINAPIS.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 290.)

1. S. *arvensis*, siliqua glabrous, many-angled, torulose, thrice as long as the 2-edged beak; stem and leaves hairy, lower ones sublyrate. *Lightf.* p. 360. *Smith*, Fl. Brit. p. 721. *Hook.* Fl. Scot. p. 204. E. B. t. 1748.

HAB. Corn-fields, very abundant. May, June. ☉.

Wild Mustard or *Charlock.*—Stem 1–2 feet high, branched. *Leaves* petiolate, ovate, rough, unequally toothed, uppermost ones sessile. *Flowers* bright yellow, corymbose. *Calyx* spreading. *Petals* obtusely obovate, sometimes emarginate. *Siliquæ* in a raceme, about 8-angled, suberect, the beak ensiform.—A most troublesome weed.

2. S. *alba*, siliqua hispid, patent, shorter than the broad ensiform beak; stem and the lyrate leaves nearly glabrous. *Lightf.* p. 361. *Smith*, Fl. Brit. p. 721. *Hook.* Fl. Scot. p. 204. E. B. t. 1677.

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. *Petals* obovate, entire. *Siliquæ* in a long raceme, glabrous or subhispid, spreading, ovate-oblong, with a long, broad ensiform beak. *Seeds* large, pale.

18. DYPLOTAXIS*.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 290. (*Sinapis tenuifolia.*)

1. D. *tenuifolia*, siliquæ pedicillate, erect, style short, fili-

* To this genus also belongs *Sisymbrium murale* of Linnæus. E. B. t. 1090.

form; uppermost leaves mostly entire; lower ones pinnate, the segments entire or pinnatifid. Decand. Syst. veg. v. 2. p. 632. *Sinapis tenuifol. Hook.* Fl. Scot. p. 204. *Sisymbrium tenuifol. Smith*, Fl. Brit. p. 703. E. B. t. 525.

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. *Siliquæ* 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 fœtid smell, when bruised.

19. RAPHANUS.

(*Nat. Ord.* CRUCIFERÆ, *Hook.* Scot. 2. p. 290.)

1. R. *Raphanistrum* siliquæ jointed, unilocular, striated, 3–8-seeded, the style long; leaves simply lyrate. *Lightf.* p. 362. *Smith*, Fl. Brit. p. 723. *Hook.* Fl. Scot. p. 204. E. B. t. 856.

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. *Siliquæ*, 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.* GERANIACEÆ, *Hook.* Scot. 2. p. 274.)

1. E. *cicutarium*, peduncles many-flowered; leaves pinnate, leaflets sessile, pinnatifid, cut; stem prostrate. *Hook.* Fl. Scot. p. 205. *Smith*, Fl. Brit. p. 727. E. B. t. 1768. *Geranium cicutarium*, *Lightf.* p. 366.

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,

leaflets sessile, ovate, serrate; stems prostrate, hairy. *Smith*, Fl. Brit. p. 728. E. B. t. 902.

HAB. Dry sandy, hilly pastures, rare. Near Prestonpans, Dr Graham. June, July. ☉.

Musky Stork's-bill.—Piloso-glandulose. *Stems* prostrate, often almost none, hairy. *Leaves* pinnate, spreading, petiolate; leaflets 4–6 pair; ovate, serrate, or toothed. *Flowers* rose-colour, 5–8 in a small pedunculate umbel; the peduncle suberect, 2–3 inches high. *Involucre* roundish, crenate. *Calyx* "tipped with red glands" *(Sm.)* *Petals* longer than the calyx, but smaller than in the preceding.

II. DECANDRIA.

2. GERANIUM.

(*Nat. Ord.* GERANIACEÆ, *Hook.* Scot. 2. p. 275.)

* *Peduncles 1-flowered.*

1. G. *sanguineum*, peduncles 1-flowered; leaves suborbicular, cleft into 5–7 deep, trifid lobes. *Lightf.* p. 372. *Smith*, Fl. Brit. p. 738. *Hook.* Fl. Scot. p. 206. E. B. t. 272.

HAB. Rocks and stony thickets, rare. Arthur's Seat, Lightfoot. Seashore at Gosford Gate, near Aberlady, plentiful, Maughan. On both sides the Frith, Mr Arnott. July. ♃.

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. *Calycine leaves* ovate, mucronate.—Very handsome.

** *Peduncles 2-flowered. Roots perennial.*

2. G. *pratense*, peduncles 2-flowered; style longer than the stamens; leaves 5–7-partite, the lobes variously acutely cleft and serrate; capsules hairy, not rugose, *Lightf.* p. 368. *Smith*, Fl. Brit. p. 732. *Hook.* Fl. Scot. p. 206. E. B. t. 404.

HAB. Meadows and moist thickets. King's Park, Mr D. Stuart. July. ♃.

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. *Petals* broadly obovate, veined. *Calycine leaves* mucronate. *Seeds* dotted.

3. G. *sylvaticum*, peduncles 2-flowered; style shorter than the stamens; leaves cleft into 5-7 deep, acute, cut, and serrate lobes; stem erect, corymbose; calycine leaves with a long awn; capsules hairy, not rugose. *Lightf.* p. 367. *Smith*, Fl. Brit. p. 731. *Hook.* Fl. Scot. p. 206. E. B. t. 121.

HAB. Woods by river-sides. Colinton woods, with white flowers, Maughan. Rosslyn and Auchindenny woods. June, July. ♃.

Wood Crane's-bill.—Stems 1–2 feet high or more, erect, hairy, branched, the uppermost branches somewhat corymbose. *Leaves* opposite, petiolate, softish, veiny, 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.

4. G. *phæum*, peduncles 2-flowered, opposite the leaves; calyx very shortly awned; petals waved; capsules keeled, hairy below, wrinkled above; stem erect. *Hook.* Fl. Scot. p. 206. *Smith*, Fl. Brit. p. 729. E. B. t. 322.

HAB. Woods, rare. Colinton woods, Maughan, Near Linlithgow, Miss Liston. Granton woods. May, June. ♃.

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.

5. G. *pyrenaicum*, peduncles 2-flowered; leaves reniform, 5–7-lobed; lobes obtuse, trifid; petals deeply notched, twice as long as the calyx; stem suberect. *Lightf.* p. 367. *Smith*, Fl. Brit. p. 735. *Hook.* Fl. Scot. p. 206. E. B. t. 405.

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.*

6. G. *rotundifolium*, peduncles 2-flowered; leaves rotundate-reniform, lobed and cut, pubescent; petals entire, as long as the calyx; capsules not rugose, hairy; seeds dotted. *Lightf.* p. 1106. *Smith*, Fl. Brit. p. 736. *Hook.* Fl. Scot. p. 207. E. B. t. 157.

HAB. Waste places, rare. East side of Mason's garden, near North Merchiston, Dr Hope. Arthur's Seat, Dr Graham. July. ☉.

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.

7. G. *molle*, peduncles 2-flowered, leaves rounded, lobed and cut, pubescent; petals notched, scarcely longer than the calyx; capsules transversely wrinkled, seeds smooth. *Lightf.* p. 370. *Smith*, Fl. Brit. p. 734. *Hook.* Fl. Scot. p. 207. E. B. t. 778.

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-

way into obtuse broad lobes. *Peduncles* opposite the leaves, hairy, shortish, divaricating. *Flowers* small, pale reddish or purple.

8. G. *lucidum*, peduncles 2-flowered; leaves roundish, shining, 5-lobed; calyx ventricose-pyramidal, angular, tuberculate; capsules wrinkled. *Lightf.* p. 370. *Smith*, Fl. Brit. p. 733. *Hook.* Fl. Scot. p. 207. E. B. t. 75.

HAB. Moist rocky places. Under Arthur's Seat, Lightfoot. A little north of Burntisland, Mr Arnott. Craiglockhart. July. ⊙.

Shining Crane's-bill.—Whole plant nearly quite glabrous. *Stems* straggling, decumbent, or in small plants erect, 3–16 inches high, branched, swollen at the joints, mostly fine red, and shining. *Leaves* shining, often red, on long petiols, 5-lobed, lobes trifid. *Calyx* 5-angled, transversely corrugate. *Flowers* small, red. *Petals* entire. *Capsule* furrowed on the back.

9. G. *robertianum*, peduncles 2-flowered; leaves ternate or quinate, the leaflets somewhat pinnatifid, segments mucronate; calyx angular, hairy, with longish awns; capsules wrinkled. *Lightf.* p. 369. *Smith*, Fl. Brit. p. 732. *Hook.* Fl. Scot. p. 207. E. B. t. 1486.

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 fœtid smell, which has been compared to that of a fox.

10. G. *columbinum*, peduncles 2-flowered; leaves 5-partite, lobes deeply cleft into linear acute segments; petals entire, as long as the awned calyx; capsules glabrous, not rugose; seeds dotted. *Lightf.* p. 372. *Smith*, Fl. Brit. p. 737. *Hook.* Fl. Scot. p. 208. E. B. t. 259.

HAB. Pastures and waste places, rare. Road-side near Queensferry, Maughan. June, July. ⊙.

Long-stalked Crane's-bill.—Stem rather straggling, slender, mostly decumbent, rough with deflexed hairs. *Leaves* opposite, petiolate, cleft into many linear, acute segments, hairy, the hairs rigid, appressed. *Peduncles* and *pedicels* very long. *Flowers* pale purple. *Calyx* hairy, mucronate.

11. G. *dissectum*, peduncles 2-flowered; petals notched, rather shorter than the awned calyx; leaves 5-partite, the lobes laciniate, linear; capsules hairy, not rugose; seeds dotted. *Lightf.* p. 371. *Smith*, Fl. Brit. p. 737. *Hook.* Fl. Scot. p. 208. E. B. t. 753.

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.

12. G. *pusillum*, peduncles 2-flowered; petals notched, scarcely longer than the calyx; leaves rotundato-reniform, 5–7-lobed, the lobes trifid; capsules keeled, downy, with appressed hairs, seeds smooth. *Hook.* Fl. Scot. p. 207. *Smith*, Fl. Brit. p. 734. E. B. t. 385.

HAB. Waste places and fields in gravelly soils, rare. Fisherrow Links, and Arthur's Seat, Maughan. June—September. ☉.

Small-flowered Crane's-bill.—Stems slender, 6–12 inches long, mostly prostrate, swelling at the joints, often reddish. *Leaves* slightly hairy, deeply lobed, opposite, petiolate; lobes trifid, rather acute. *Flowers* pentandrous, very small, purple. *Peduncles* short. *Calyx* awnless.

III. POLYANDRIA.

3. MALVA.

(*Nat. Ord.* MALVACEÆ, *Hook.* Scot. 2. p. 274.)

1. M. *sylvestris*, stem erect, herbaceous; leaves with 7 somewhat acute lobes; peduncles and petiols hairy. *Lightf.* p. 375. *Smith*, Fl. Brit. p. 740. *Hook.* Fl. Scot. p. 208. E. B. t. 671.

HAB. Waste places, common. King's Park, Mr Yalden. June—August. ♃.

Common Mallow.—Root fusiform. *Stems* about 2 feet high, erect, branched, hairy. *Leaves* numerous, large, roundish, petiolate, alternate, plicate, 7-lobed, crenato-serrate. *Flowers* large, handsome, reddish-purple, veined, axillary, on short pedicels, 2–4 together. *Petals* obcordate, thrice as long as the calyx.

2. M. *rotundifolia*, stem somewhat prostrate; leaves roundish, cordate, obtusely 5-lobed; "peduncles bent downwards." *Lightf.* p. 374. *Smith*, Fl. Brit. p. 741. *Hook.* Fl. Scot. p. 208. E. B. t. 1092. M. *pusilla*, E. B. t. 241.

HAB. Waste places; road-sides. About Portobello. June—August. ☉.

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.

3. M. *moschata*, stem erect: radical leaves reniform, lobed and cut, cauline ones 5-partite, pinnatifid, and laciniate; calyx hairy. *Lightf.* p. 376. *Smith*, Fl. Brit. p. 741. *Hook.* Fl. Scot. p. 209. E. B. t. 754.

HAB. Borders of fields and road-sides, not common. Near Lasswade, Maughan. August. ♃.

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.

4. LAVATERA.

(*Nat. Ord.* MALVACEÆ, *Hook.* Scot. 2. p. 274.)

1. L. *arborea*, stem arborescent; leaves 7-angled, plaited, downy; peduncles axillary, clustered, 1-flowered. *Lightf.* p. 374. *Smith*, Fl. Brit. p. 742. *Hook.* Fl. Scot. p. 209. E. B. t. 1841.

HAB. Rocks on the sea-coast. Inchgarvie and Mykrick-Inch, Frith of Forth, Sibbald. July, August. ♂.

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.

XVII. DIADELPHIA.

I. HEXANDRIA.

1. FUMARIA.

(*Nat. Ord.* FUMARIÆ, *Hook.* Scot. 2. p. 291.)

1. F. *officinalis*, siliculæ globose; fruit-bearing pedicels erect, twice as long as the bracteas, the racemes lax; stem suberect; leaves bipinnate and cleft, segments linear. *Lightf.* p. 379. *Smith*, Fl. Brit. p. 750. *Hook.* Fl. Scot. p. 210. E. B. t. 589.

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.

2. F. *capreolata*, siliculæ globose; fruit-bearing pedicels recurved, longer than the bracteas, the racemes oblong; stem somewhat climbing by the cirrhose petiols; leaves much divided, the segments more or less obovate. *Lightf.* p. 380. *Smith*, Fl. Brit. p. 751. *Hook.* Fl. Scot. p. 210. E. B. t. 943.

HAB. Corn-fields, and waste bushy places. About Redhall, Lightfoot. June—September. ☉.

Ramping Fumitory.—Glabrous, glaucous. *Stems* procumbent or climbing, 1–3 feet long, much branched, angular. *Leaves* on long petiols, triternate, primary and secondary petiols slender, and serving as tendrils, leaflets 3-cleft, segments ovate or oblong. *Peduncles* opposite the leaves, erect. *Flowers* 5–10, flesh-colour; the pedicels of the glabrous capsules, scarcely longer than the bracteas.

2. CORYDALIS.

(*Nat. Ord.* FUMARIÆ, *Hook.* Scot. 2. p. 291. under *Fumaria.*)

1. C. *claviculata*, stem branched, widely climbing; leaves somewhat bipinnate, divided, segments oval, entire, the petiols cirrhose; bracteas longer than the pedicels. DC. *Fumaria*

clavicul. Lightf. p. 380. *Smith*, Fl. Brit. p. 752. *Hook.* Fl. Scot. p. 211. E. B. t. 103.

HAB. Rocky and waste places; roofs of cottages, &c. Ravelston Quarry, Mr D. Stewart. July, August. ☉.

Climbing Fumitory.—Glabrous. *Stem* very slender, much branched, and climbing upon every thing in its way, 1–3 feet long. *Leaves* subglaucous beneath, petiolate, bearing the leaflets also on slender secondary petiols, and at length terminating in a branched tendril. *Flowers* 4–8, in small racemes, pale whitish-yellow, scarcely more than 3 lines long. *Siliculæ* small, oblong, tipped with the acute style, 2–4-seeded.—Plant pale, delicate and elegant.

II. OCTANDRIA.

3. POLYGALA.

(*Nat. Ord.* POLYGALEÆ, *Hook.* Scot. 2. p. 285.)

1. P. *vulgaris*, flowers in a terminal spike, erect; wings of the calyx obtuse, longer than the corolla; stem herbaceous, procumbent; leaves linear-lanceolate. *Lightf.* p. 381. *Smith*, Fl. Brit. p. 752. *Hook.* Fl. Scot. p. 211. E. B. t. 76.

HAB. Dry hilly pastures, very abundant. June, July. ♃.

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.* LEGUMINOSÆ, *Hook.* Scot. 2. p. 266.)

* *Branches unarmed.*

1. G. *scoparia*, leaves ternate or solitary, obovato-oblong; flowers axillary; legume hairy at the margin; branches angular, armless. *Hook.* Fl. Scot. p. 211. *Spartium scoparium*, *Lightf.* p. 382. *Smith*, Fl. Brit. p. 753. E. B. t. 1339.

HAB. Banks and wild bushy places, common. June. ♄.

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.

2. G. *tinctoria*, leaves lanceolate, glabrous; branches round, striate, erect; flowers in a leafy raceme; legume glabrous. *Lightf.* p. 384. *Smith*, Fl. Brit. p. 754. *Hook.* Fl. Scot. p. 212. E. B. t. 44.

HAB. Heathy pastures and river-sides. Pentland Hills. July. ♄.

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 5 sharp teeth.

** *Branches spinose.*

3. G. *anglica*, leaves ovato-lanceolate, glabrous; spines simple; flowering branches unarmed; legumes glabrous. *Lightf.* p. 384. *Smith*, Fl. Brit. p. 756. *Hook.* Fl. Scot. p. 212. E. B. t. 132.

HAB. Heathy places, not common. Pentland Hills, Maughan. June. ♄.

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.* LEGUMINOSÆ, *Hook.* Scot. 2. p. 266.)

1. U. *europæus*, teeth of the calyx obsolete, connivent; bracteas ovate, lax; branches erect. *Lightf.* p. 385. *Smith*, Fl. Brit. p. 756. *Hook.* Fl. Scot. p. 212. E. B. t. 742.

HAB. Heaths and hilly pastures, abundant. May—September. ♄.

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.

2. U. *nanus*, "teeth of the calyx lanceolate, spreading; bracteas minute, close-pressed; branches reclining;" (*Sm.*) *Hook.* Fl. Scot. p. 212. *Smith*, Fl. Brit. p. 757. E. B. t. 743. U. *europæus*, β, *Lightf.* p. 385.

HAB. Heaths. Pentland Hills, G. Don. August—October. ♄.

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.* LEGUMINOSÆ, *Hook.* Scot. 2. p. 267.)

1. O. *arvensis*, stem hairy; branches at length spinous; flowers mostly solitary; leaves ternate below, simple above, serrate, entire at the base. *Lightf.* p. 386. *Smith*, Fl. Brit. p. 758. *Hook.* Fl. Scot. p. 212. E. B. t. 682. *O. repens*, *Lightf.* p. 387.

HAB. Heathy pastures. Road-sides. King's Park, Mr Yalden. June, August. ♃.

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.* LEGUMINOSÆ, *Hook.* Scot. 2. p. 267.)

1. A. *vulneraria*, herbaceous; leaves pinnate, unequal; heads

of flowers in pairs. *Lightf.* p. 387. *Smith*, Fl. Brit. p. 759. *Hook.* Fl. Scot. p. 213. E. B. t. 104.

Hab. Dry pastures. King's Park, Lightfoot, (abundant). June—August. ♃.

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.)

1. O. *tuberosus*, leaves pinnate, leaflets lanceolate, glaucous beneath; stipules semi-sagittate, toothed at the base; stem simple, erect. *Lightf.* p. 388. *Smith*, Fl. Brit. p. 761. *Hook.* Fl. Scot. p. 213. E. B. t. 1153.

Hab. Woods and borders of fields. King's Park, Mr Yalden. Rosslyn woods, &c. June. ♃.

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 cirrhose, but ending in a point beyond the last leaflets. *Flowers* 5–7, in a long pedunculate, clustered, axillary raceme, 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.* Leguminosæ, *Hook.* Scot. 2. p. 267.)

1. L. *pratensis*, peduncles 2–10-flowered; petiols bearing one pair of lanceolate leaflets, and ending in a simple or divided tendril; stipules sagittate, nearly as large as the leaves. *Lightf.* p. 391. *Smith*, Fl. Brit. p. 765. *Hook.* Fl. Scot. p. 213. E. B. t. 670.

Hab. Meadows, pastures, hedges, very common. July, August. ♃.

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 secund racemed head; peduncle very long. *Legumes* glabrous, erecto-patent, blackish.

2. L. *sylvestris*, peduncles 5–8-flowered; petiols bearing one pair of 3-ribbed lanceolate leaflets, and ending in a trifid tendril; stipules semi-sagittate; stem winged. *Lightf.* p. 392. *Smith*, Fl. Brit. p. 765. *Hook.* Fl. Scot. p. 213. E. B. t. 805.

Hab. Waste bushy places, rare. Debris of Salisbury Craigs, Miss Boswell. July, August. ♃.

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 Scotica*.

10. VICIA.

(*Nat. Ord.* LEGUMINOSÆ, *Hook.* Scot. 2. p. 268.)

* *Peduncles elongate, many-flowered.*

1. V. *sylvatica*, peduncles many-flowered; leaflets oval-oblong, mucronate; stipules lunate, denticulate. *Lightf.* p. 393. *Smith*, Fl. Brit. p. 768. *Hook.* Fl. Scot. p. 214. E. B. t. 79.

HAB. Woods and waste bushy places, rare. Debris of Salisbury Craigs, Lightfoot. Colinton woods, Maughan. July, August. ♃.

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.

2. V. *Cracca*, peduncles many-flowered, flowers imbricated; leaves pinnate, leaflets lanceolate, pubescent; stipules semi-sagittate, mostly entire. *Lightf.* p. 394. *Smith*, Fl. Brit. p. 769. *Hook.* Fl. Scot. p. 214. E. B. t. 1168.

HAB. Bushy places and road-sides, very frequent. July, August. ♃.

Tufted 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 secund imbricate raceme, on a rather short peduncle. *Legumes* glabrous, pendulous.

** *Flowers axillary, nearly sessile.*

3. V. *sativa*, flowers sessile, mostly in pairs, legumes suberect; lower leaves retuse; stipules toothed, with a dark spot beneath; seeds smooth. *Lightf.* p. 395. *Smith*, Fl. Brit. p. 769. *Hook.* Fl. Scot. p. 215. E. B. t. 334.

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, oblongo-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.

4. V. *lathyroides*, flowers sessile, solitary, legumes glabrous, erect; leaflets 4–6, those of the lower leaves obcordate; stipules entire; seeds tuberculate. *Lightf.* p. 396. *Smith*, Fl. Brit. p. 771. *Hook.* Fl. Scot. p. 215. E. B. t. 30.

HAB. Dry pastures. King's Park, and Leith gravel-pit, Dr Parsons. Blackford Hill, Maughan. Dalmahoy Hill, Messrs Borrer and Hooker. Burntisland, Mr Arnott. May, June. ☉.

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-*

pules without any spot. *Flower* smaller than the preceding, purple, (scarcely more than twice the length of the calyx). *Legume* erect, glabrous. *Seeds* dotted.

5. V. *lutea*, flowers sessile, solitary, legumes reflexed, hairy; stems diffuse; stipules minute, red; standard of the flower glabrous. *Hook.* Fl. Scot. p. 215. *Smith*, Fl. Brit. p. 772. E. B. t. 481.

HAB. Stony sea-coasts, very rare. Sea-side west of N.' Queensferry, G. Don; (It is still there, Dr Graham, 1820.) June, July. ♃.

Rough-podded Yellow Vetch.—Root creeping. *Stems* about a foot high, branched, weak and diffuse, furrowed, climbing. *Leaves* pinnate, the petiol ending in a branched tendril; leaflets 5–9 pair, elliptic-lanceolate, hairy, especially beneath. *Flowers* large, pale yellow. *Legumes* hairy, compressed.

6. V. *sepium*, legumes 3–4 on a very short peduncle, suberect, glabrous; leaves pinnate, leaflets ovate, obtuse, becoming smaller towards the tendril. *Lightf.* p. 397. *Smith*, Fl. Brit. p. 773. *Hook.* Fl. Scot. p. 215. E. B. t. 1515.

HAB. Bushy places, very common. Sometimes with white flowers, Dr Graham. June, July. ♃.

Bush Vetch.—Stems 1–2 feet high, slightly branched, climbing. *Leaves* pinnate, the petiol 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.)

1. E. *hirsutum*, peduncles many-flowered, legumes hairy, 2-seeded; leaflets linear-oblong, truncate. *Lightf.* p. 398. *Smith*, Fl. Brit. p. 776. *Hook.* Fl. Scot. p. 216. E. B. t. 970.

HAB. Corn-fields and pastures, frequent. King's Park, (abundant by the road from St Leonard's to Duddingston), Mr Yalden. June. ☉.

Hairy Tare.—Stems slender, climbing or subprostrate, 6 inches to above 2 feet long, weak, slender, subglabrous. *Leaves* pinnate, the petiol 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.)

1. O. *perpusillus*, leaves pinnate, leaflets small, numerous; flowers capitate, bracteated; legumes curved upwards, beaked. *Lightf.* p. 399. *Smith*, Fl. Brit. p. 776. *Hook.* Fl. Scot. p. 216. E. B. t. 369.

HAB. Dry sandy pastures, rare. North Queensferry, Dr Graham. June. ☉.

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.* LEGUMINOSÆ, *Hook.* Scot. 2. p. 268.)

* *Keel of the corolla ending in a straight point.*

1. A. *uralensis*, silky; legumes erect, hairy, ovate-cylindrical; scape erect, longer than the leaves, few-flowered. *Lightf.* p. 401. t. 17. *Smith*, Fl. Brit. p. 780. *Hook.* Fl. Scot. p. 216. E. B. t. 466.

HAB. Dry mountains and hilly pastures. Hills a little to the west, above N. Queensferry, Maughan. July. ♃.

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 bractea 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.*

2. A. *hypoglottis*, stem prostrate; leaflets slightly emarginate; flowers capitate; legumes erect, hairy, ovate, compressed, the cells 1-seeded. *Hook.* Fl. Scot. p. 217. *Smith*, Fl. Brit. p. 779. E. B. t. 274. *A. arenarius*, *Lightf.* p. 400.

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. ♃.

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 bracteas, clothed with black and white hairs intermixed. *Legumes* ovate, turgid, canaliculate on the back, hairy.

3. *glycyphyllos*, stem prostrate; legumes somewhat triangular, curved, sessile, glabrous; leaves longer than the peduncles, leaflets oval. *Lightf.* p. 399. *Smith*, Fl. Brit. p. 779. *Hook.* Fl. Scot. p. 217. E. B. t. 203.

HAB. Woods, rare. Coryton woods, Dr Parsons. Banks of the Water of Leith between Coltbridge and Saughtonhall; many places on the coast between Nether Cramond and Queensferry, Maughan. July. ♃.

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.* LEGUMINOSÆ, *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.*

p. 402. *Smith*, Fl. Brit. p. 781. *Hook.* Fl. Scot. p. 217. E. B. t. 1340.

HAB. Bushy places, borders of fields, &c. Near Drummond-Lodge, Dr Parsons. Aberlady Links, Sibbald. July. ☉.

Common Melilot.—Stem erect, 2 feet high or more, furrowed. *Leaves* glabrous. *Stipules* lanceolate, entire. *Flowers* yellow, in secund pedunculate racemes, numerous, rather drooping. *Calyx* hairy. *Legumes* pendulous and elliptical.

** *Flowers more or less capitate.*

† *Legumes many-seeded.*

2. T. *ornithopodioides* *, legumes naked, subternate, twice as long as the calyx, seeds about 8; stems procumbent. *Lightf.* p. 403. *Smith*, Fl. Brit. p. 782. *Hook.* Fl. Scot. p. 218. E. B. t. 1047.

HAB. Barren sandy pastures, rare. At Maitland Bridge between Edinburgh and Musselburgh, Lightfoot. Fisherrow and Musselburgh Links, Maughan. June. ☉.

Bird's-foot Trefoil.—Stems prostrate, 2–4 inches long, spreading, glabrous. *Leaflets* small, obcordate, toothed at the apex, glabrous. *Stipules* lanceolate, in pairs. *Flowers* 2–3, slender, pale rose-colour, sessile, on short peduncles. *Legumes* obtuse, hairy.

3. T. *repens*, heads umbellate; legumes 4-seeded, covered by the persistent corolla; stem creeping. *Lightf.* p. 404. *Smith*, Fl. Brit. p. 782. *Hook.* Fl. Scot. p. 218. E. B. t. 1769.

HAB. Meadows and pastures, very common. May—September. ♃.

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, reddish, or whitish.)*

4. T. *pratense*, "heads dense, ovate; lower tooth of the calyx, shorter than the tube of the monopetalous unequal corolla; leaflets oval, nearly entire; stem ascending." *Willd. Lightf.* p. 405. *Smith*, Fl. Brit. p. 785. *Hook.* Fl. Scot. p. 218. E. B. t. 1770.

HAB. Meadows and pastures, very common. June—September. ♃.

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.*

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* This species is placed by Lamarke, Decandolle, and Hooker (Curt. Fl. Lond. ed. 2.), in the genus *Trigonella.*

5. T. *medium*, "heads lax, somewhat globose, solitary; lower tooth of the corolla as long as the tube of the monopetalous, nearly equal corolla; leaflets elliptical, minutely serrate." *Willd.* *Hook.* Fl. Scot. p. 218. *Smith*, Fl. Brit. p. 786. E. B. t. 190. *T. alpestre*, *Lightf.* p. 406.

HAB. Fields, waste places, road-sides, frequent. Road-sides near Libberton. July, August. ♃.

Zigzag Trefoil.—Stems flexuose, branched, 1–2 feet high. *Leaflets* oblong-lanceolate, glabrous, pilose at the margin, spotless. *Stipules* lanceolate. *Flowers* in rather lax roundish heads. *Calyx* glabrous, except the teeth. *Standard* of the *corolla* not much longer than the wings.

6. T. *arvense*, heads of flowers very hairy, cylindrical; calycine teeth setaceous, longer than the corolla; leaflets narrow-obovate. *Lightf.* p. 406. *Smith*, Fl. Brit. p. 787. *Hook.* Fl. Scot. p. 219. E. B. t. 944.

HAB. Dry pastures and waste gravelly places. King's Park, Mr Yalden. Debris of Salisbury Craigs, abundant. July, August. ☉.

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*.

7. T. *scabrum*, heads of flowers terminal and axillary, sessile, ovate; calycine teeth unequal, lanceolate, rigid, at length recurved; leaves obcordate. *Lightf.* p. 407. *Smith*, Fl. Brit. p. 788. *Hook.* Fl. Scot. p. 219. E. B. t. 903.

HAB. Dry banks and pastures, especially near the sea. Near Edinburgh, Dr Parsons. King's Park. June, July. ☉.

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.

8. T. *striatum*, heads of flowers ovate, sessile, terminal and axillary; calyx striated, hairy, the teeth straight, subulate; leaflets pubescent. *Lightf.* p. 408. *Smith*, Fl. Brit. p. 790. *Hook.* Fl. Scot. p. 219. E. B. t. 1843.

HAB. Dry pastures. King's Park, abundant, Lightfoot. Banks facing the sea at N. Queensferry, plentiful. June. ☉.

Soft knotted Trefoil.—Stem several, procumbent, 3–8 inches long, spreading, pilose. *Leaflets* obovate 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.

9. T. *fragiferum*, heads of flowers roundish, on long peduncles; calyx much inflated after flowering, pubescent, two of the teeth long, subulate, recurved; leaflets glabrous, ribbed with nerves. *Hook.* Fl. Scot. p. 219. *Smith*, Fl. Brit. p. 791. E. B. t. 1050.

Hab. Moist pastures, especially in the neighbourhood of the sea. Links near Cockenzie, Mr C. Stewart. Leith Links, Mr J. Mackay. Aberlady Links, Maughan. July, August. ♃.

Strawberry-headed Trefoil.—Stems prostrate, 6–16 inches long, glabrous. *Leaves* on long, glabrous, erect petiols; 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.)*

10. T. *procumbens*, heads of flowers oval, densely imbricate, standard deflexed, sulcate, very broad; middle leaflet on a partial petiol; stem procumbent. *Hook.* Fl. Scot. p. 219. *Smith*, Fl. Brit. p. 792. E. B. t. 945. *T. agrarium*, *Lightf.* p. 409.

Hab. Dry pastures and waste gravelly places, frequent. Debris of Salisbury Craigs, &c. June, July. ☉.

Hop Trefoil.—Stems many, procumbent or slightly ascending, 4–12 inches long, more or less pubescent, mostly simple from the base. *Leaves* on short petiols; leaflets obovate, denticulate, glabrous, middle one on a partial petiol 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 chesnut-colour.

11. T. *filiforme*, heads of flowers subhemispherical, rather lax, two to many-flowered, the peduncles capillary; persistent standard deflexed, somewhat sulcate; stem procumbent. *Hook.* Fl. Scot. p. 220. *Smith*, Fl. Brit. p. 792. E. B. t. 1257. *T. minus*, *Smith*, E. B. t. 1256. *Hook.* Fl. Scot. p. 220. *T. procumbens*, *Lightf.* p. 409.

Hab. Pastures and waste places, very common. June, July. ☉.

Slender Yellow Trefoil.—Stems procumbent, or ascending when growing among other plants, subglabrous, slender, slightly branched, 6–18 inches long. *Leaves* on short pubescent petiols; leaflets obovate or obcordate, glabrous, denticulate, the middle one sessile, or on a short partial petiol. *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.* Leguminosæ, *Hook.* Scot. 2. p. 270.)

1. L. *corniculatus*, heads few-flowered, depressed; calyx pilose; stem decumbent, solid; "claw of the keel obovate," *Sm.*;

leaves pilose beneath. *Lightf.* p. 411. *Smith*, Fl. Brit. p. 793. *Hook.* Fl Scot. p. 220. E. B. t. 2090.

HAB. Pastures, extremely common. June—August. ♃.

Common Bird's-foot Trefoil.—Stems 3–8 inches long, spreading, slightly branched, more or less clothed with appressed hairs. *Leaves* shortly petiolate; 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.

2. L. *major*, heads many-flowered, depressed; calyx glabrous, except the teeth, which are ciliate; stem erect, hollow; "claw of the keel linear," (*Sm.*); leaflets pubescent beneath. *Smith*, E. B. t. 2091. *L. corniculatus*, β. *Hook.* Fl. Scot. p. 220. γ. and δ. *Smith*, Fl. Brit. p. 794.

HAB. Hedges and moist bushy places, frequent. Rosslyn and Granton woods, Mr Arnott. June—September. ♃.

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.

(*Nat. Ord.* LEGUMINOSÆ, *Hook.* Scot. 2. p. 270.)

1. M. *lupulina*, heads oval; legumes reniform, rugose, 1-seeded; leaflets obovate; stem procumbent. *Lightf.* p. 412. *Smith*, Fl. Brit. p. 797. *Hook.* Fl. Scot. p. 220. E. B. t. 971.

HAB. Hedges, pastures, road-sides, frequent. King's Park, Mr Yalden. Quarry beyond Slateford, common, Dr Graham. May—August. ♂.

Black Medick or *Nonsuch.*—Stems several, procumbent or ascending, 6–18 inches long, somewhat angular. *Leaves* on short petiols; leaflets obovate, 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.

XVIII. POLYADELPHIA.

I. POLYANDRIA.

1. HYPERICUM.

(*Nat. Ord.* HYPERICINÆ, *Hook.* Scot. 2. p. 272.)

* *Stems prostrate.*

1. H. *humifusum*, styles 3; stem compressed, procumbent;

flowers subcymose, somewhat terminal; leaves ovate-oblong, glabrous. *Lightf.* p. 418. *Smith*, Fl. Brit. p. 803. *Hook.* Fl. Scot. p. 222. E. B. t. 1226.

HAB. Gravelly pastures and also bogs. Dalmahoy Hill, Mr Neill. Lasswade, Mr D. Steuart. Pentland Hills, Maughan. Road-sides and fields about Rosslyn. June—August. ♃.

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.*

2. H. *quadrangulum*, styles 3, stem herbaceous, 4-angled; leaves ovate, with pellucid dots; calycine segments lanceolate. *Lightf.* p. 416. *Smith*, Fl. Brit. p. 801. *Hook.* Fl. Scot. p. 221. E. B. t. 370.

HAB. Boggy meadows and stream-sides, not unfrequent. Ditch by Blackford farm-house, Mr Neill. July. ♃.

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.

3. H. *perforatum*, styles 3; stem roundish-compressed, with two obsolete angles; leaves elliptical-oblong, obtuse, with pellucid dots; calycine segments lanceolate. *Lightf.* p. 416. *Smith*, Fl. Brit. p. 801. *Hook.* Fl. Scot. p. 221. E. B. t. 295.

HAB. Woods, hedges, &c., frequent. King's Park, Mr Yalden. Corstorphine Hill, Mr Neill. July. ♃.

Perforated St John's Wort.—Stem 1–2 feet high, glabrous, somewhat branched, erect. *Leaves* opposite, decussating, glabrous, those of the small branches narrow. *Flowers* large, yellow, rather numerous, in terminal, corymbose panicles. *Calyx* acute, entire. *Petals* finely dotted with purple at the margin. *Anthers* tipped with a dark gland.

†† *Calycine segments fringed with glandular serratures.*

4. H. *hirsutum*, styles 3; stem erect, round, pubescent; calyx fringed with glands; leaves ovate, hairy above, pubescent beneath. *Lightf.* p. 419. *Smith*, Fl. Brit. p. 804. *Hook.* Fl. Scot. p. 222. E. B. t. 1156.

HAB. Woods and hedges, not unfrequent. Colinton woods, Mr Arnott. At Burntisland, Mr Neill. July. ♃.

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. *Calycine 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-

amplexicaul. *Lightf.* p. 420. *Smith*, Fl. Brit. p. 804. *Hook.* Fl. Scot. p. 222. E. B. t. 1227.

HAB. Dry sandy woods, heaths, road-sides, not unfrequent. Pentland Hills, and Rosslyn woods, Maughan. King's Park, Mr Bainbridge. July. ♃.

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.

XIX. SYNGENESIA.

I. POLYGAMIA ÆQUALIS.

1. TRAGOPOGON.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 234.)

1. T. *pratensis*, involucre* as long as the corolla; leaves undivided, glabrous, acuminate, carinate; peduncles cylindrical. *Lightf.* p. 420. *Smith*, Fl. Brit. p. 812. *Hook.* Fl. Scot. p. 226. E. B. t. 434.

HAB. Meadows and waste pastures. King's Park, Mr Yalden. Burnt-island, Cockenzie, Salisbury Craigs, Mr Arnott. Beach at Caroline Park, Mr Neill. June. ♂.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 234.)

1. S. *palustris*, peduncles and involucres hispid, somewhat umbellate; leaves runcinate, sagittate at the base, dentate; root not creeping. *Smith*, Fl. Brit. p. 816. E. B. t. 935.

HAB. Banks of rivers and lake-sides, rare. Lochend (a single plant only seen), Mr Neill. July, August. ♃.

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, subpanicled, yellow, large. *Involucre* glanduloso-pilose.

2. S. *arvensis*, peduncles subumbellate, hispid as well as the involucre; leaves runcinate, dentate, cordate at the base. *Lightf.* p. 427. *Smith*, Fl. Brit. p. 817. *Hook.* Fl. Scot. p. 226. E. B. t. 674.

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* The *calyx* of Smith and most others.

HAB. Corn-fields, very common. July. ♃.

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.

3. S. *oleraceus*, peduncles tomentose, subumbellate; involucre glabrous; leaves more or less runcinate, toothed, prickly, or subentire. *Lightf.* p. 428. *Smith*, Fl. Brit. p. 817. *Hook.* Fl. Scot. p. 227. E. B. t. 843.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 234.)

1. L. *virosa*, leaves horizontal, oblong, obtuse, toothed, the keel prickly. *Lightf.* p. 429. *Smith*, Fl. Brit. p. 819. *Hook.* Fl. Scot. p. 227. E B. t. 1957.

HAB. Waste places and road-sides, rare. King's Park, beneath Sampson's Ribs, Lightfoot. August. ♂.

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 *cauline 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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 235.)

1. L. *Taraxacum*, outer scales of the involucre reflexed; leaves runcinate, glabrous, toothed. *Lightf.* p. 432. *Smith*, Fl. Brit. p. 822. *Hook.* Fl. Scot. p. 227. E. B. t. 510.

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 acrid, 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.

2. L. *palustre*, outer scales of the involucre erect, appressed; leaves sinuato-runcinate, toothed, subglabrous. *Hook.* Fl. Scot. p. 227. *Smith*, Fl. Brit. p. 823. E. B. t. 553.

HAB. Boggy pastures. Pentland Hills, Maughan. Rosslyn woods, half way to Lasswade, June, July. ♃.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 235.)

1. A. *hispida*, scape 1-flowered; leaves dentate, scabrous; florets hairy at their orifice, glandular at the tip. *Hook.* Fl. Scot. p. 228. *Hedypnois hispida*, *Smith*, Fl. Brit. p. 823. E. B. t. 554. *Leontodon hispidum*, *Lightf.* p. 433.

HAB. Meadows and pastures, frequent. River-side at Rosslyn, Mr Neill. King's Park, Mr Bainbridge. June. ♃.

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.

2. A. *hirta*, scape 1-flowered; leaves dentate, scabrous; involucre subglabrous; florets destitute of hairs at the mouth of the tube; outer pericarps with a scaly pappus. *Hook.* Fl. Scot. p. 228. *Hedypnois hirta*, *Smith*, Fl. Brit. p. 824. E. B. t. 555.

HAB. Pastures. North Queensferry, Maughan. July, August. ♃.

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.

4. A. *autumnalis*, scape branched, squamose; leaves lanceolate, toothed or pinnatifid, subglabrous; involucre elongate. *Hook.* Fl. Scot. p. 228. *Hedypnois autumnalis*, *Smith*, Fl. Brit. p. 826. E. B. t. 830. *Leontodon autumnale*, *Lightf.* p. 433.

HAB. Meadows and pastures, very common. King's Park, Mr Yalden. August. ♃.

Autumnal Apargia.—Leaves all radical, spreading, irregularly toothed or pinnatifid, smooth or roughish. *Scapes* 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 *.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 235.)

* *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 regreted, as Scotland is remarkably rich in them. The Pentland

lanceolate, entire, hairy, pubescent beneath; scions creeping. *Lightf.* p. 436. *Smith*, Fl. Brit. p. 828. *Hook.* Fl. Scot. p. 229. E. B. t. 1093.

HAB. Dry banks, wall-tops, &c. frequent. King's Park, Mr Yalden. Bank a mile beyond Corstorphine, on the road to Kirkliston. June. ♃.

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. ♃.

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

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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. H. *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.

5. H. *paludosum*, glabrous; stem panicled, angular, fistulose; leaves ovate-oblong, acute, toothed, cordato-amplexicaul; involucre clothed with black bristles. *Lightf.* p. 538. *Smith*, Fl. Brit. p. 831. *Hook.* Fl. Scot. p. 232. E. B. t. 1094. (not good.)

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.

6. H. *prænanthoides*, stem erect, branched, many-flowered; leaves cordate-ovate, acute, amplexicaul, toothed and rough at the margin, more or less hairy on both sides, glaucous beneath, the lower ones oblong; involucre simply downy. *Hook.* Fl. Scot. p. 232. *Smith*, Fl. Brit. p. 835. E. B. t. 2235.

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 nerve; 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-

bescence, intermixed with longish, bristly, pale, spreading hairs. *Involucre* downy, with pale sub-appressed hairs.

7. H. *sabaudum*, stem rigid, panicled, hispid, clothed with cordate, semiamplexicaul, acute, dentate leaves, hairy beneath, lower ones ovate-lanceolate; peduncles clothed with a short pubescence, sometimes intermixed with long hispid hairs; involucre slightly hairy. *Lightf.* p. 439. *Smith*, Fl. Brit. p. 834. *Hook.* Fl. Scot. p. 233. E. B. t. 349.

Hab. Shady, rocky, and woody places. Rosslyn and Colinton woods, Maughan. August, September. ♃.

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.

(*Nat. Ord.* Compositæ, *Hook.* Scot. 2. p. 237.)

1. C. *tectorum*, leaves glabrous, runcinate, the upper ones linear sagittate, amplexicaul; stem glabrous; involucre pubescent. *Lightf.* p. 440. *Smith*, Fl. Brit. p. 837. *Hook.* Fl. Scot. p. 233. E. B. t. 1111.

Hab. Walls; roofs; pastures, &c. common. King's Park, Mr Yalden, July—September. ☉.

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.

(*Nat. Ord.* Compositæ, *Hook.* Scot. 2. p. 237.)

1. H. *radicata*, scape branched, glabrous, squamose upwards, and swelling beneath the involucre; leaves sinuato or lyrato-runcinate, spreading, scabrous. *Lightf.* p. 443. *Smith*, Fl. Brit. p. 842. *Hook.* Fl. Scot. p. 234. E. B. t. 831.

Hab. Meadows and pastures, very common. King's Park, &c. July. ♃.

Long-rooted Cat's-ear.—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.

(*Nat. Ord.* Compositæ, *Hook.* Scot. 2. p. 237.)

1. L. *communis*, involucre of the fruit angular; stem panicled; the peduncles slender; leaves of the stem ovate, petiolate, angulato-dentate. *Lightf.* p. 444. *Smith*, Fl. Brit. p. 842. *Hook.* Fl. Scot. p. 234. E. B. t. 844.

HAB. Waste places and cultivated ground, very common. July, August. ☉.

Nipple-wort.—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. *Involucre* glabrous, rigid, the leaves lanceolate, erect. *Pericarps* not furnished with a pappus.

10. CICHORIUM.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 237.)

1. C. *Intybus*, flowers sessile, axillary, in pairs; leaves runcinate. *Hook.* Fl. Scot. p. 234. *Smith*, Fl. Brit. p. 843. E. B. t. 539.

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 muricate 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.* COMPOSITÆ, *Hook.* Scot. 2. p. 238.)

1. A. *Lappa*, leaves cordate, petiolate, without prickles. *Lightf.* p. 445. *Smith*, Fl. Brit. p. 844. *Hook.* Fl. Scot. p. 235. E. B. t. 1228.

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. *Involucre* 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 involucre, 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.* COMPOSITÆ, *Hook.* Scot. 2. p. 238.)

* *Leaves decurrent.*

1. C. *nutans*, leaves decurrent, spinous; flowers drooping; scales of the involucre lanceolate, cottony, outer ones spreading. *Lightf.* p. 450. *Smith*, Fl. Brit. p. 848. *Hook.* Fl. Scot. p. 235. E. B. t. 1112.

HAB. Dry pastures: waste places and road-sides. Fisherrow Links: West Pans; about Cockenzie, Maughan. Behind the Castle; and on the coast about Aberlady, abundantly, Dr Graham. July, August. ♂.

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* Vid. Journal of a Horticultural Tour through Flanders, Holland, &c. Edinb. 1823.

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.

2. C. *acanthoides*, leaves decurrent, sinuate, spinous; involucre globose, subsessile, the scales linear, recurved, somewhat cottony. *Hook.* Fl. Scot. p. 236. *Smith*, Fl. Brit. p. 848. E. B. t. 973. C. *crispus*, *Lightf.* p. 452.

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.

3. C. *tenuiflorus*, leaves decurrent, spinose, sinuate, somewhat cottony beneath; involucre subcylindrical, clustered, sessile, the scales lanceolate, erect, ending in a sharp spine. *Hook.* Fl. Scot. p. 236. *Smith*, Fl. Brit. p. 849. E. B. t. 412. C. *acanthoides*, *Lightf.* p. 452.

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.*

4. C. *marianus*, cauline leaves amplexicaul, sinuate, spinous; radical ones pinnatifid; scales of the involucre foliaceous, edged with small spines, at length recurved and ending in a large one. *Lightf.* p. 454. *Smith*, Fl. Brit. p. 851. *Hook.* Fl. Scot. p. 236. E. B. t. 976.

Hab. Waste places and road-sides, not frequent. West side of the Castle Rock, Dr Parsons. King's Park (near Duddingston Loch), Maughan. 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.

(*Nat. Ord.* Compositæ, *Hook.* Scot. 2. p. 238.)

* *Leaves decurrent.*

1. Cn. *lanceolatus*, leaves decurrent, pinnatifid, hispid, the segments divaricate, spinose; involucre ovate, tomentose, the

scales lanceolate, spreading. *Hook.* Fl. Scot. p. 236. *Carduus, lanceol. Lightf.* p. 450. *Smith*, Fl. Brit. p. 847. E. B. t. 107.

HAB. Fields and road-sides, very common. July, August. ♂.

Spear 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.

2. Cn. *palustris*, leaves decurrent, scabrous, pinnatifid, very spinous; flowers in terminal clusters; involucres ovate, the scales ovate-lanceolate appressed. *Hook.* Fl. Scot. p. 236. *Carduus palust. Lightf.* p. 452. *Smith*, Fl. Brit. p. 850. E. B. t. 974.

HAB. Boggy meadows; moist lanes, &c. common. Rosslyn woods. July. ♂.

Marsh Thistle.—Stem 3–5 feet high, erect, branched, winged; wings and leaves with abundance of short spines. *Leaves* long, narrow, sinuato-pinnatifid, the margin fringed with spines. *Flowers* dark purple, small, in terminal clusters. *Involucre* mostly ovate, but sometimes nearly globose, the scales shortly mucronate.—Flowers sometimes white.

** *Leaves sessile.*

3. Cn. *arvensis*, leaves sessile, pinnatifid, spinous; stem panicled; involucre ovate or globose, the scales ovate-lanceolate, mucronate, appressed. *Hook.* Fl. Scot. p. 237. *Carduus arvensis, Smith*, Fl. Brit. p. 850. E. B. t. 975. *Serratula arvensis, Lightf.* p. 449.

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.

4. Cn. *eriophorus*, leaves sessile, pinnatifid, the segments pointing alternately upwards, spinous, scabrous; involucre spherical, woolly, the scales linear, spreading. *Hook.* Fl. Scot. p. 237. *Carduus erioph. Lightf.* p. 454. *Smith*, Fl. Brit. p. 852. E. B. t. 386.

HAB. Waste places and road-sides, rare. Sea-side between Blackness and Queensferry, Sibbald? Road-side near Oxenford Castle and Chesterhall, Maughan. July. ♂.

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. *Involucre* of great size, exceedingly woolly between the scales.

5. Cn. *heterophyllus*, leaves amplexicaul, lanceolate, ciliato-dentate, undivided or subpinnatifid, white and downy beneath; flowers 1–3. *Hook.* Fl. Scot. p. 237. *Carduus heteroph.*

Lightf. p. 456. *Smith*, Fl. Brit. p. 853. E. B. t. 675. *Carduus helenioides*, *Lightf.* p. 467.

HAB. Marshy grounds, chiefly in woods and upland pastures. Rosslyn and Auchindenny woods, Maughan. Pentland Hills, near Currie. July. ♃.

Melancholy Thistle.—Root creeping. *Stem* about 3 feet high, mostly simple, furrowed, clothed with a white woolly down. *Leaves* varying in form; the *lower ones* mostly oblong-lanceolate, toothed, but sometimes laciniate or pinnatifid; glabrous and green above, very white beneath. *Flowers* 1–3, large, purple. *Involucre* ovate, dark green, slightly pubescent, the scales lanceolate, erect, not spinous.

14. ONOPORDON.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 239.)

1. O. *Acanthium*, scales of the involucre spreading, subulate; leaves ovate-oblong, decurrent, sinuate and spinous, woolly on both sides. *Lightf.* p. 458. *Smith*, Fl. Brit. p. 856. *Hook.* Fl. Scot. p. 238. E. B. t. 977.

HAB. Waste places. Wemyss, Fifeshire; beyond Prestonpans, Lightfoot. Between Limekilns and Charlestown, Mr Neill. Near Cockenzie; Links at Port Seton, Maughan. Near Musselburgh, Mr Arnott. August. ♂.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 240.)

1. B. *cernua*, flowers drooping, bracteas lanceolate, entire; leaves lanceolate, serrate; bristles of the pericarp about 4, erect. *Lightf.* p. 461. *Smith*, Fl. Brit. p. 858. *Hook.* Fl. Scot. p. 238. E. B. t. 1114.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 240.)

1. E. *cannabinum*, leaves 3 or 5-partite, the segments lanceolate, deeply serrate. *Lightf.* p. 464. *Smith*, Fl. Brit. p. 860. *Hook.* Fl. Scot. p. 238. E. B. t. 428.

HAB. Marshy places and stream-sides. Among rocks below Kinghorn, Lightfoot. West of Burntisland, Mr Neill. Lasswade, Mr D. Stuart. August. ♃.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 240.)

1. A. *maritima*, leaves downy, pinnate, the leaflets linear, 3-cleft; flowers oblong, sessile, drooping, racemed; receptacle naked. *Lightf.* p. 466. *Smith*, Fl. Brit. p. 864. excl. var. γ. *Hook*, Fl. Scot. p. 239. E. B. t. 1706.

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.

2. A. *gallica*, leaves downy, pinnate, linear, radical ones capillary; flowers ovate, erect, racemed; receptacle naked. *Hook.* Fl. Scot. p. 239. *Smith*, E. B. t. 1001. (A. *maritima*).

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.

3. A. *Absinthium*, leaves bi- or tri-pinnatifid, clothed with a close silky down, the segments lanceolate; flowers drooping, roundish; receptacle hairy. *Lightf.* p. 467. *Smith*, Fl. Brit. p. 864. *Hook.* Fl. Scot. p. 239. E. B. t. 1230.

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, panicled, accompanied by entire, oblong bracteas. *Style* large, recurved, the stigma cloven.—Plant intensely bitter.

4. A. *vulgaris*, leaves pinnatifid, segments cut, whitish and downy beneath; flowers ovate, in racemed panicles; receptacle naked. *Lightf.* p. 468. *Smith*, Fl. Brit. p. 866. *Hook.* Fl. Scot. p. 240. E. B. t. 978.

HAB. Waste places and road-sides, very common. August. ♃.

Mugwort.—Stems 3–4 feet high, branched, ribbed, glabrous. *Leaves* very

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; subsessile and ovate, not drooping. *Scales* of the *involucre* ovate, downy. *Florets* few.

17. GNAPHALIUM.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 241.)

* *Flowers diœcious.*

1. G. *dioicum*, shoots procumbent; stems simple; flowers diœcious, few, corymbose; radical leaves spathulate. *Lightf.* p. 470. t. 20. *Smith*, Fl. Brit. p. 869. *Hook.* Fl. Scot. p. 240. E. B. t. 267.

HAB. Dry heathy pastures. Arthur's Seat, Lightfoot. Pentland Hills, and hills above N. Queensferry, Mr Neill. June, July. ♃.

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).*

2. G. *sylvaticum*, stem simple, erect, downy; flowers in a leafy spike; leaves linear-lanceolate, downy, especially beneath. *Lightf.* p. 471. *Smith*, Fl. Brit. p. 869. *Hook.* Fl. Scot. p. 240. E. B. t. 913.

β, Leaves nearly glabrous above; spike longer, more interrupted. *Hook.* Fl. Scot. p. 240. G. *rectum*, *Smith*, l. c. p. 870. E. B. t. 124.

HAB. Woods and sandy pastures. β, Pentland Hills; Figget Whins, Mr Neill. August. ♃.

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.

3. G. *uliginosum*, stem much branched, the branches spreading, woolly; leaves linear-lanceolate; flowers in terminal, leafy, clustered heads. *Lightf.* p. 473. *Smith*, Fl. Brit. p. 872. *Hook.* Fl. Scot. p. 241. E. B. t. 1194.

HAB. Damp sandy places, and "wet commons where water has stood in the winter," frequent. August, September. ☉.

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.

4. G. *minimum*, stem erect, slender, branched upwards; leaves lanceolate, acute, cottony; flowers ovate, in small lateral and terminal clusters longer than the leaves. *Hook.* Fl. Scot. p. 241. *Smith*, Fl. Brit. p. 873. E. B. t. 1157. *Filago montana*, *Lightf.* p. 502.

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; branched, 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.

5. G. *germanicum*, stem erect, branched in a proliferous manner upwards; leaves lanceolate, cottony; flowers small, in dense round heads, axillary and terminal. *Hook.* Fl. Scot. p. 241. *Smith*, Fl. Brit. p. 874. E. B. t. 946. *Filago germanica*, *Lightf.* p. 501.

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 proliferous manner, each terminated by a similar head of flowers;" (*Hook.*) Whole plant woolly. *Leaves* erect, small. *Flowers* yellowish.

18. TUSSILAGO.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 242.)

1. T. *Farfara*, scape 1-flowered, scaly; flowers rayed; leaves roundish-cordate, angular, toothed, tomentose beneath. *Lightf.* p. 475. *Smith*, Fl. Brit. p. 878. *Hook.* Fl. Scot. p. 242. E. B. t. 429.

HAB. Fields; banks; waste places, very common. March, April. ♃.

Colt's-foot.—Scape 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.

2. T. *Petasites*, scape many-flowered, scaly; flowers forming a thyrsus, the florets all tubular; leaves very large, unequally toothed, the lobes of the cordate base approximate. *Lightf.* p. 477. *Smith*, Fl. Brit. p. 880. *Hook.* Fl. Scot. p. 242. E. B. t. 431. *T. hybrida*, *Lightf.* p. 476. *Smith*, l. c. p. 879. E. B. t. 430.

HAB. Sides of streams, very common. April, May. ♃.

Common Butter-bur.—Scape 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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 242.)

* *Florets all tubular.*

1. S. *vulgaris*, leaves semi-amplexicaul, sinuato-pinnatifid, dentate; flowers corymbose, the florets all tubular. *Lightf.* p. 478. *Smith*, Fl. Brit. p. 881. *Hook.* Fl. Scot. p. 243. E. B. t. 747.

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.*

2. S. *viscosus*, ray revolute; leaves pinnatifid, viscid; scales of the involucre lax, hairy. *Lightf.* p. 478. *Smith*, Fl. Brit. p. 882. *Hook.* Fl. Scot. p. 243. E. B. t. 32.

HAB. Waste places, on heaps of stony soil, &c. At Dysart, Lightfoot. King's Park, Maughan. Near Newhaven, Sir J. E. Smith. Salisbury Craigs, Mr Neill. July, August. ☉.

Stinking Groundsel.—Stem 12–18 inches high, branched, diffuse, piloso-glandulose, 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.

3. S. *sylvaticus*, ray revolute; leaves pinnatifid, lobed and toothed; scales of the involucre very short, glabrous; stem erect, straight; flowers corymbose. *Lightf.* p. 480. *Smith*, Fl. Brit. p. 882. *Hook.* Fl. Scot. p. 244. E. B. t. 748.

HAB. Waste places chiefly on hilly pastures. Figget Whins, and on the south side of Blackford Hill, abundant, Mr Neill. July. ☉.

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.*

4. S. *Jacobæa*, ray spreading; leaves lyrate, bipinnatifid, toothed, glabrous; pericarps of the disk hairy. *Lightf.* p. 480. *Smith*, Fl. Brit. p. 885. *Hook.* Fl. Scot. p. 244. E. B. t. 1130.

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.

5. S. *aquaticus*, ray spreading; leaves lyrate, serrate, glabrous, the lowermost undivided; involucre hemispherical; pericarps glabrous. *Hook.* Fl. Scot. p. 244. *Smith*, Fl. Brit. p. 885. E. B. t. 1131. S. *Jacobæa*, γ, *Lightf.* p. 485.

HAB. Marshes; lake-sides, &c. common. July, August. ♃.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 242.)

1. A. *Tripolium*, leaves linear-lanceolate, fleshy, glabrous; stem glabrous; flowers corymbose; scales of the involucre lanceolate, obtuse, erect, imbricate. *Lightf.* p. 482. *Smith*, Fl. Brit. p. 888. *Hook.* Fl. Scot. p. 244. E. B. t. 87.

HAB. Salt-marshes on the sea-coast, rare near Edinburgh. Sea mill-dam, Burntisland Bay; Inverkeithing Bay, Mr Neill. Aberlady Bay, Dr Graham. August, September. ♃.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 243.)

1. S. *Virgaurea*, cauline leaves lanceolate, serrate; flowers in an upright, elongate panicle. *Lightf.* p. 482. *Smith*, Fl. Brit. p. 889. *Hook.* Fl. Scot. p. 245. E. B. t. 301.

HAB. Woods and banks in subalpine situations, frequent. Plentiful at the waterfall at Habbie's How, and elsewhere on the Pentland Hills, Messrs Neill and Graham. Colinton and Rosslyn woods, Maughan. July—September. ♃.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 243.)

1. D. *Pardalianches*, leaves cordate, repando-dentate, radical ones petiolate, cauline ones amplexicaul. *Lightf.* p. 485. *Smith*, Fl. Brit. p. 896. *Hook.* Fl. Scot. p. 245. E. B. t. 630.

HAB. Woods, and waste places about old buildings. Rosslyn woods, Maughan. Colinton woods, G. Don. June, July. ♃.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 243.)

1. B. *perennis*, scape naked, 1-flowered; root creeping; leaves obovate. *Lightf.* p. 487. *Smith*, Fl. Brit. p. 897. *Hook.* Fl. Scot. p. 246. E. B. t. 424.

HAB. Pastures and road-sides, every where. March—October. ♃.

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.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 243.)

1. C. *Leucanthemum*, leaves amplexicaul, oblong, obtuse, variously cut, pinnatifid at the base, the radical ones petiolate, obovate. *Lightf.* p. 488. *Smith*, Fl. Brit. p. 898. *Hook.* Fl. Scot. p. 246. E. B. t. 601.

HAB. Banks and pastures, common. June, July. ♃.

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*, scariose.

2. C. *segetum*, leaves amplexicaul, glaucous, more or less toothed or pinnatifid; ray of the corolla obcordate (yellow). *Lightf.* p. 489. *Smith*, Fl. Brit. p. 899. *Hook.* Fl. Scot. p. 246. E. B. t. 540.

HAB. Corn-fields, (usually common, but, to the credit of the farmers around Edinburgh, very rare in the neighbourhood). August. ☉.

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, scariose at the margin.

25. PYRETHRUM.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 244.)

1. P. *Parthenium*, leaves bipinnate, plane, petiolate, the leaflets ovate, cut; flowers corymbose, on branched peduncles; stem erect. *Hook.* Fl. Scot. p. 246. *Smith*, Fl. Brit. p. 900. E. B. t. 1231. *Matricaria Parthenium*, *Lightf.* p. 490.

HAB. Waste places, chiefly near houses. Restalrig, Mr Neill. Lane near Aberlady, Dr Graham. July. ♃.

Common Feverfew.—Stem erect, much branched, 2 feet high or more, fur-

rowed. *Leaves* more or less divided, the leaflets decurrent, slightly hoary. *Flowers* numerous, rather small, terminal, solitary, on branched, naked peduncles, thickened beneath the involucre; the ray short, nearly as broad as long, white, disk yellow. *Involucre* hemispherical, downy.—Plant very bitter and aromatic, with a strong smell.

2. P. *inodorum*, leaves sessile, bipinnatifid, the segments capillary; stem branched, spreading; pappus entire. *Hook.* Fl. Scot. p. 246. *Smith*, Fl. Brit. p. 900. E. B. t. 676. *Chrysanthemum inodorum*, *Lightf.* p. 488.

HAB. Fields and waste places, very common. August—October. ☉.

Scentless Feverfew.—Stem about a foot high, branched, angular, glabrous, the branches diffuse. *Leaves* deep green, glabrous. *Flowers* large, terminal, solitary; the ray white, linear-oblong, the disk convex, yellow. *Peduncles* long, naked. *Involucre* glabrous. *Receptacle* quite naked, obtusely conical. *Pappus* not lobed.

3. P. *maritimum*, leaves bipinnatifid, the segments linear, fleshy, awnless; stem branched, diffuse; pappus lobed. *Hook.* Fl. Scot. p. 246. *Smith*, Fl. Brit. p. 901. E. B. t. 979. *Matricaria maritima*, *Lightf.* p. 491.

HAB. Sandy places on the sea-coast, rare. On Inchcolm abundantly, Mr Neill. July. ♃.

Sea-side Feverfew.—Stem 6–12 inches high, glabrous, branched, very leafy, scarcely erect. *Leaves* sessile, deep green, shining. *Flowers* solitary, terminal, smaller than the preceding (not an inch broad), the ray white, oblong, the disk yellow. *Involucre* glabrous. *Pappus* divided into 2–4 lobes.

26. MATRICARIA.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 244.)

1. M. *Chamomilla*, leaves glabrous, pinnate or bipinnatifid, the segments linear-capillary; involucre nearly plane, the scales obtuse. *Lightf.* p. 491. *Smith*, Fl. Brit. p. 902. *Hook.* Fl. Scot. p. 247. E. B. t. 1232.

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 (¾ths of an inch broad), terminal, and solitary; the ray white, spreading, truncate, the disk yellow, conical.—Smell weak, and taste slightly bitter.

27. ANTHEMIS.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 244.)

1. A. *arvensis*, leaves bipinnatifid, the segments linear, pubescent; receptacle conical, its chaffy scales lanceolate, carinate; pericarps crowned with an entire pappus. *Lightf.* p. 494. *Smith*, Fl. Brit. p. 905. *Hook.* Fl. Scot. p. 247. E. B. t. 602.

HAB. Corn-fields and road-sides, rather rare. Lanes about Lasswade, and on the north side of Linlithgow, Dr Parsons. Rosslyn woods, Mr Neill. July. ♂.

Corn Chamomile.—Stem erect, much branched, covered with a hoary pu-

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.

2. A. *Cotula*, leaves bipinnatifid, glabrous, the segments linear; receptacle conical, its chaffy scales subulate; pericarps without a pappus. *Lightf.* p. 495. *Smith*, Fl. Brit. p. 906. *Hook.* Fl. Scot. p. 247. E. B. t. 1772.

HAB. Corn-fields and waste places, not common. Near Gibbet Toll, Mr Neill. Road-sides about Rosslyn. July, August. ☉.

Stinking Chamomile.—Stem a foot high or more, branched, glabrous. *Leaves* bipinnatifid, the segments cut, bright green, sometimes slightly pilose. *Flowers* rather small, terminal, solitary, the rays white, oval, "reflexed at night" (*Sm.*), the disk yellow, convex.—Plant with a fœtid smell, and sprinkled, according to Dr Hooker, with minute glands.

28. ACHILLEA.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 244.)

1. A. *Ptarmica*, leaves linear-lanceolate, acute, sharply serrate. *Lightf.* p. 495. *Smith*, Fl. Brit. p. 908. *Hook.* Fl. Scot. p. 248. E. B. t. 757.

HAB. Moist fields and pastures, frequent. King's Park, Mr Neill. Pentland Hills. July, August. ♃.

Sneeze-wort.—Root creeping. *Stem* erect, 1–2 feet high, glabrous. *Leaves* glabrous, undivided. *Flowers* about half an inch in diameter, in a flattish, terminal corymb; the rays short, truncate, white, as is also the disk.

2. A. *Millefolium*, leaves long, bipinnate, slightly hairy, the segments linear, toothed, acute; stem furrowed. *Lightf.* p. 496. *Smith*, Fl. Brit. p. 908. *Hook.* Fl. Scot. p. 248. E. B. t. 758.

HAB. 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 flattish, branched, terminal corymb.

III. POLYGAMIA FRUSTRANEA.

29. CENTAUREA.

(*Nat. Ord.* COMPOSITÆ, *Hook.* Scot. 2. p. 239.)

1. C. *nigra* scales of the involucre ovate, ciliate, with erect, capillary teeth; lower leaves angulato-lyrate, upper ones sessile, ovate. *Lightf.* p. 498. *Smith*, Fl. Brit. p. 910. *Hook.* Fl. Scot. p. 248. E. B. t. 278.

HAB. 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. *Involucre* globose, the scales blackish.

2. C. *Cyanus*, scales of the involucre serrate; leaves linear, the lower ones toothed, the upper entire. *Lightf.* p. 498. *Smith*, Fl. Brit. p. 911. *Hook.* Fl. Scot. p. 249. E. B. t. 277.

HAB. Corn-fields, frequent. July. ☉.

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. *Involucre* ovate, greenish. *Peduncle* thickened upwards.

3. C. *Scabiosa*, scales of the involucre ciliate, pubescent; leaves pinnatifid, the segments lanceolate, subdentate, pilose. *Lightf.* p. 500. *Smith*, Fl. Brit. p. 911. *Hook.* Fl. Scot. p. 249. E. B. t. 56.

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. ♃.

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. *Involucre* globose, the scales broad, cottony, blackish; "in time they become reflexed and conspicuous at a distance, being of a most beautiful silvery hue," (*Sm.*)

XX. GYNANDRIA.

I. MONANDRIA.

1. ORCHIS.

(*Nat. Ord.* ORCHIDEÆ, *Hook.* Scot. 2. p. 187.)

* *Tubers 2, undivided.*

1. O. *Morio*, lip 3-lobed, lobes crenate, obtuse, the middle one emarginate; segments of the perianth ascending, obtuse; spur linear-conical, ascending, shorter than the germen. *Lightf.* p. 514. *Smith*, Fl. Brit. p. 920. *Hook.* Fl. Scot. p. 250. E. B. t. 2059.

HAB. Pastures and meadows, rare about Edinburgh, June. Near Habbie's How? Mr D. Steuart. June. ♃.

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.

2. O. *mascula*, lip 3-lobed, crenulate, obtuse, the middle lobe bifid; segments of the perianth acute, the outer ones reflexed; spur conical, ascending, as long as the germen. *Lightf.* p. 515. *Smith*, Fl. Brit. p. 920. *Hook.* Fl. Scot. p. 250. E. B. t. 631.

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. 4.

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.*

3. O. *latifolia*, lip slightly 3-lobed, the sides reflexed; inner segments of the perianth connivent, the two outer ones reflexed; spur conical, shorter than the germen; bracteas longer than the flowers. *Lightf.* p. 516. *Smith*, Fl. Brit. p. 924. *Hook.* Fl. Scot. p. 251. E. B. t. 2308.

HAB. Marshes and moist meadows, frequent. About Comely Bank, Mr Neill. Duddingston Loch, Mr Bainbridge. Hunter's Bog, Dr Graham. Rosslyn woods, abundant. June. 4.

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.

4. O. *maculata*, lip plane, 3-lobed, crenate; inner segments of the perianth connivent, the lateral ones patent; spur cylindrical, shorter than the germen; bracteas as long as the germen. *Lightf.* p. 517. *Smith*, Fl. Brit. p. 925. *Hook.* Fl. Scot. p. 251. E. B. t. 632.

HAB. Meadows and pastures, frequent. King's Park, Mr Yalden. Duddingston Loch with red flowers, and at Figget Whins surrounded by seedling plants with undivided bulbs, Dr Graham. June, July. 4.

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.

(*Nat. Ord.* ORCHIDEÆ, *Hook.* Scot. 2. p. 188.)

1. G. *Conopsea.*

Hook. Fl. Scot. p. 251. *Orchis conopsea*, *Lightf.* p. 518. *Smith*, Fl. Brit. p. 926. E. B. t. 10.

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 germen. 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 germen. "The 2 cells of the *anthers* are perforated at the base, through which the naked, large, and oblong glands of the stalks of the pollen-mass appear." *(Hook.)* *Pollen-mass* green.—Flower very fragrant.

3. HABENARIA.

(*Nat. Ord.* ORCHIDEÆ, *Hook.* Scot. 2. p. 188.)

1. H. *viridis*, spur short, 2-lobed; lip 3-toothed, the 2 lateral teeth acute, the middle one very short; bracteas much longer than the flowers. *Hook.* Fl. Scot. p. 252. *Satyrium viride*, *Lightf.* p. 519. *Smith*, Fl. Brit. p. 928. E. B. t. 94.

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.

2. H. *albida*, spur obtuse, thrice as short as the germen; lip tripartite, the segments acute, the middle one the largest. *Hook.* Fl. Scot. p. 252. *Satyrium albidum*, *Lightf.* p. 519. *Smith*, Fl. Brit. p. 929. E. B. t. 505.

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 Falconar 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 germen. *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.

3. H. *bifolia*, spur filiform, twice the length of the germen; lip linear, entire; radical leaves 2, oblong, attenuate at the base, *Hook.* Fl. Scot. p. 252. *Orchis bifolia*, *Lightf.* p. 412. *Smith*, Fl. Brit. p. 918. E. B. t. 22.

HAB. Moist meadows and pastures. About Auchindenny, Lightfoot. Guillon Links, Dr Graham. On the Pentland Hills, in various places. May, June. ♃.

Butterfly Habenaria.—Stem 12–18 inches high, leafy, ribbed. *Radical leaves* 2, large, oblong; *cauline ones* very small, lanceolate. *Bracteas* as long as the germen. *Flowers* yellowish white, rather large, in an oblong spike. The 3 *upper segments* of the *perianth* connivent, the middle one of which is cordate and obtuse; lateral segments spreading. *Lip* bent downwards, long, linear-ovate to linear. *Lobes* of the *anther* very distant.—Sometimes fragrant.

4. LISTERA.

(*Nat. Ord.* ORCHIDEÆ, *Hook.* Scot. 2. p. 189.)

1. L. *ovata*, stem 2-leaved, the leaves ovate and opposite; column of fructification having an appendage, in which the anther is placed. *Hook.* Fl. Scot. p. 253. *Ophrys ovata*, *Lightf.* p. 523. *Smith*, Fl. Brit. p. 923. E. B. t. 1548.

HAB. Woods and moist meadows, and pastures. Swanston wood, Mr Neill. Meadow-ground south of Ravelrig-toll, Maughan. Pentland Hills, about Currie and elsewhere. June. ♃.

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.

2. L. *cordata*, stem 2-leaved, the leaves opposite, cordate; lip with 2 teeth at the base, bifid at the apex; the segments linear-subulate. *Hook.* Fl. Scot. p. 253. *Ophrys cordata*, *Lightf.* p. 524. *Smith*, Fl. Brit. p. 933. E. B. t. 358.

HAB. Moist bushy places, and damp mossy banks, in subalpine situations. Fir-wood between Woodhouslee and the Bush; peat-bog at Ravelrig-toll; and on the Pentland Hills, Messrs Somerville and E. Maughan. July, August. ♃.

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.

3. L. *Nidus-Avis*, stem with sheathing scales, leafless. *Hook.* Fl. Scot. p. 253. *Ophrys Nidus-Avis*, *Lightf.* p 522. *Smith*, Fl. Brit. p. 931. E. B. t. 48.

HAB. Shady woods, very rare. Auchindenny woods, Dr Parsons. Woods at Dalhousie, Maughan. May, June. ♃.

Bird's-nest Listera.—Root composed of densely-fasciculated, fleshy, short fibres. *Stem* 9–16 inches high, hollow, leafless. *Bracteas* lanceolate, longer than the pedicels. *Flowers* numerous, brown, in a rather lax spike. *Segments* of the *perianth* somewhat connivent. *Lip* longer than the perianth, of a deeper colour, somewhat deflexed, the apex bifid, the segments short, obtuse, and divaricate. *Pollen-masses* oblong, farinaceous. *Capsule* ovate, ribbed, glandulose.

5. EPIPACTIS.

(*Nat. Ord.* ORCHIDEÆ, *Hook.* Scot. 2. p. 189.)

1. E. *latifolia*, leaves ovate, amplexicaul; lower bracteas

longer than the drooping flowers; lip entire, acuminate, shorter than the petals. *Hook.* Fl. Scot. p. 254. *Serapias latifolia, Lightf.* p. 526. *Smith*, Fl. Brit. p. 942. E. B. t. 269.

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.)

1. C. *innata*, spur abbreviated, adnate, (apparently wanting.) *Hook.* Fl. Scot. p. 255. *Ophrys corallorrhiza, Lightf.* p. 513. t. 23. *Smith*, Fl. Brit. p. 932. E. B. t. 1547.

HAB. Moist mossy woods, very rare. Peat-bog near Ravelrig-toll, among the willows, Mr E. Maughan. June, July. ♃.

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.—I 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. MONŒCIA.

I. MONANDRIA.

1. ZANNICHELLIA.

(*Nat. Ord.* FLUVIALES, *Hook.* Scot. 2. p. 193.)

1. Z. *palustris*, anthers 4-celled, stigmas entire; pericarps toothed, and winged on the back. *Lightf.* p. 534. *Smith*, Fl. Brit. p. 955. *Hook.* Fl. Scot. p. 258. E. B. t. 1844.

HAB. Ditches and ponds. Lochend, Mr Neill. In a small pool near Luffness. August. ☉.

Horned Pondweed.—Stems long, filiform, floating, branched, glabrous. *Leaves* numerous, opposite, linear, entire. *Bracteas* membranaceous. *Flowers*

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. CALLITRICHE.

(*Nat. Ord.* HALORAGEÆ, *Hook.* Scot. 2. p. 258.)

1. C. *aquatica.*

Hook. Fl. Scot. p. 259. *Smith*, Fl. Brit. p. 8. E. B. t. 722. C. *verna* and *autumnalis*, *Lightf.* p. 70.

HAB. Ditches and ponds, and small streams, very common. April—October. ♃.

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, those 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.

(*Nat. Ord.* FLUVIALES, *Hook.* Scot. 2. p. 193.)

1. Z. *marina*, leaves entire, somewhat 3-nerved; stem roundish. *Lightf.* p. 530. *Smith*, Fl. Brit. p. 7. *Hook.* Fl. Scot. p. 259. E. B. t. 467.

HAB. Marine ditches, and forming large beds in the sea itself, frequent. Black Rocks at Leith, Mr Neill. June—August. ♃.

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 oblong-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.* AROIDEÆ, *Hook.* Scot. 2. p. 192.)

1. T. *latifolia*, leaves linear, nearly plane; sterile and fertile catkins close together. *Lightf.* p. 538. *Smith*, Fl. Brit. p. 959. *Hook.* Fl. Scot. p. 259. E. B. t. 1455.

HAB. Sides of ponds and streams. Lochend, Maughan. July. ♃.

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. SPARGANIUM.

(*Nat. Ord.* AROIDEÆ, *Hook.* Scot. 2. p. 191.)

1. S. *ramosum*, leaves triangular at the base, their sides concave; common flower-stalk branched; stigma linear. *Hook.* Fl. Scot. p. 260. *Smith*, Fl. Brit. p. 961. E. B. t. 744. S. *erectum*, *Lightf.* p. 539.

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.

2. S. *simplex*, leaves triangular at the base, their sides plane; common flower-stalk simple; stigma linear. *Hook.* Fl. Scot. p. 260. *Smith*, Fl. Brit. p. 962. E. B. t. 745.

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.—Lightfoot comprehended this and the preceding under the common name of *Erectum*, but mentions the present species as the most common variety.

3. S. *natans*, leaves plane, floating; common flower-stalk simple; stigma ovate; head of sterile flowers mostly solitary. *Lightf.* p. 541. *Smith*, Fl. Brit. p. 962. *Hook.* Fl. Scot. p. 260. E. B. t. 273.

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.* CYPERACEÆ, *Hook.* Scot. 2. p. 174.)

DIV. I. *Spike diœcious; simple and solitary, both on the sterile and fertile culm.*

1. C. *dioica*, spike simple, diœcious; fruit ascending, ovate,

striate, rough on the margin towards the apex; leaves and culm glabrous. *Lightf.* p. 541. *Smith*, Fl. Brit. p. 963. *Hook.* Fl. Scot. p. 260. E. B. t. 534.

HAB. Bogs and heaths, common. Blackford Hill. Pentland Hills. Ravelrig-toll moss. May, June. ♃.

Straight-fruited diœcious Carex.—Root creeping. *Culm* 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.

2. C. *Davalliana*, spike simple, diœcious; fruit ovate-acuminate, recurved and deflexed, striate, angles roughish; culm scabrous on the angles. *Hook.* Fl. Scot. p. 260. *Smith*, Fl. Brit. p. 964. E. B. t. 2123.

HAB. Bogs. Near Crossgate-toll; and by the side of Guillon Loch, Maughan. June. ♃.

Recurved-fruited Diœcious Carex.—Root not creeping. *Culms* 6–12 inches high, slender, rough. *Leaves* setaceous, much shorter than the culm. *Spike* linear-oblong. *Glumes* brown, very scariose, 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.*)

3. C. *pulicaris*, spike simple, androgynous, few-flowered; fruit oblong-lanceolate, reflexed, remote. *Lightf.* p. 543. *Smith*, Fl. Brit. p. 965. *Hook.* Fl. Scot. p. 261. E. B. t. 1051.

HAB. Bogs, common. Hunter's Bog, in the King's Park; and by Habbie's How, Mr Neill. Pentland Hills; and Ravelrig-toll moss. May, June. ♃.

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.

4. C. *muricata*, spikelets sterile at their apex, subcompound, collected into a more or less interrupted spike; fruit convexo-plane, ovate-acuminate, acutely margined, bifid at the apex. *Hook.* Fl. Scot. p. 262. *Smith*, Fl. Brit. p. 974. E. B. t. 1097. C. *spicata*, *Lightf.* p. 548.

HAB. Marshes near Figget Whins, Mr Neill. Banks of Duddingston Loch. June. ♃.

Greater prickly Carex.—Root fibrous. *Culms* 12–18 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, scariose, 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. *divulsa*, 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, ovate-acuminate, 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 Figget 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* ovate-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 panicled, rather acute spike; fruit patent, ovate-acuminate; 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 panicled 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* ovate-acute, with a hispid keel, and a broad, white, very scariose 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, ovate-acute; culm rounded between the angles; root not tufted. *Smith*, Fl. Brit. p. 977. E. B. t. 1065. C. *paniculata* β. *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 panicled 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. *Bracteas* short, setaceous. *Spike* about an inch long, reddish brown, close and compact. *Glumes* with a smooth keel, scariose, 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 straggling, is so striking, that I cannot avoid thinking them different.

** *Upper or intermediate spikelets sterile.*

8. C. *arenaria*, lower spikelets fertile, upper ones sterile, all crowded; fruit ovate, marginate; culm triangular, incurved; leaves plane. *Lightf.* p. 545. *Smith*, Fl. Brit. p. 971. *Hook.* Fl. Scot. p. 261. E. B. t. 928.

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 bracteas* 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.

9. C. *intermedia*, inferior and superior spikelets fertile, intermediate ones sterile; culm triangular, erect. *Hook.* Fl. Scot. p. 262. *Smith*, Fl. Brit. p. 972. E. B. t. 2042. C. *disticha*, *Lightf.* p. 546.

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 bracteas* subfoliaceous, not so long as the spike. *Spike* oblong, 1½–2 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.*

10. C. *stellulata*, spikelets sterile at their base, 2–4, subremote, roundish; fruit patent, ovate-acuminate, concave on the upper surface, with roughish margins. *Hook.* Fl. Scot. p. 263. *Smith*, Fl. Brit. p. 966. E. B. t. 806. *C. muricata*, *Lightf.* p. 549.

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. *Bracteas* 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.

11. C. *curta*, spikelets sterile at their base, 4–6, ovate-elliptical, approximate, bracteas very minute, the lowest rarely so long as the spikelet; fruit broadly ovate, acute, longer than the cordate glume. *Hook.* Fl. Scot. p. 263. *Smith*, Fl. Brit. p. 967. E. B. t. 1386. C. *canescens*, *Lightf.* p. 550.

HAB. Bogs and moist low woods, not uncommon near Edinburgh. North Queensferry, Mr J. Mackay. Ravelrig-toll Moss, about the willows, plentiful. Pentland Hills, many places, Maughan. June. ♃.

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, scariose.—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.

12. C. *ovalis*, spikelets sterile at their base, 5–6, oval, approximate, alternate; fruit ovate-acuminate, as long as the glume, with a broad membranaceous margin, bifid at the apex. *Hook.* Fl. Scot. p. 263. *Smith*, Fl. Brit. p. 968. E. B. t. 306. C. *leporina*, *Lightf.* p. 547.

HAB. Bogs and marshy meadows, frequent. Ravelrig-toll Moss. Pentland Hills. West side of Lochend. June. ♃.

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 bractea* sometimes foliaceous at the apex, but never as long as the spike, frequently all are shorter than the spikelets, and quite scariose. *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 scariose than the upper ones.

13. C. *remota*, spikelets sterile at their base, distant, the two or three lower bracteas as long or longer than the spike; fruit ovate-acuminate, bifid at the apex, longer than the glumes. *Lightf.* p. 549. *Smith*, Fl. Brit. p. 969. *Hook.* Fl. Scot. p. 263. E. B. t. 832.

HAB. Woods and moist shady places. Rosslyn and Auchindenny woods. June. ♃.

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. *Smith*, Fl. Brit. p. 970. E. B. t. 993.

HAB. Woods, rare. Banks of the Esk, above Melville Castle, Dr Graham. June. ♃.

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.*

15. C. *pendula*, fertile spikelets very long and drooping, sterile one single; sheaths nearly as long as the peduncle; fruit ovate, rostrate, densely imbricate. *Lightf.* p. 564. *Smith*, Fl. Brit. p. 981. *Hook.* Fl. Scot. p. 264. E. B. t. 2315.

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, glaucous 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.

16. C. *strigosa*, sterile spikelet single, fertile ones about 4, filiform, lax, suberect, at length drooping; fruit oblong, triquetrous, acute; sheaths nearly as long as the peduncles. *Hook.* Fl. Scot. p. 264. *Smith*, Fl. Brit. p. 982. E. B. t. 994.

HAB. Woods. Arniston woods, Maughan. May, June. ♃.

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.

17. C. *sylvatica*, sterile spikelet mostly single, fertile ones slender, subfiliform, drooping, lax; fruit ovate, triquetrous, with a long subulate beak; sheaths not half the length of the peduncles. *Lightf.* p. 562. *Smith*, Fl. Brit. p. 983. *Hook.* Fl. Scot. p. 264. E. B. t. 995.

HAB. Woods. Rosslyn and Auchindenny woods. June. ♃.

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, scariose and silvery, with a broad, green keel, scabrous towards the apex.

++ *Fertile spikelets cylindrical-oblong, ovate, or roundish.*

18. C. *pallescens*, sterile spikelet terminal, fertile ones 2–3, ovate-cylindrical, shortly pedunculate, subpendulous; lower bractea foliaceous, rising above the culm; fruit ovate, tumid, obtuse. *Lightf.* p. 558. *Smith*, Fl. Brit. p. 989. *Hook.* Fl. Scot. p. 266. E. B. t. 2185.

HAB. Boggy woods and marshes. Ravelrig-toll Moss, and Pentland Hills in many places. June. ♃.

Pale Carex.—Root fibrous. *Culms* 8–18 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.

19. C. *flava*, sterile spikelet mostly single, fertile ones roundish or oval, subsessile or pedunculate; sheaths of the foliaceous bracteas half as long as the peduncle; fruit obovate, ribbed, with a long recurved beak. *Lightf.* p. 551. *Smith*, Fl. Brit. p. 990. *Hook.* Fl. Scot. p. 266. E. B. t. 1294.

HAB. Bogs, heaths, marshy pastures, common. King's Park, Mr Neill. Pentland Hills, abundant. June. ♃.

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. Œderi* 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.

20. C. *extensa*, sterile spikelets mostly single, fertile ones 3–5, approximate, or with the lowest one very distant, ovate, subsessile; sheaths of the very long foliaceous bracteas almost none; fruit ovate-acute. *Hook.* Fl. Scot. p. 267. *Smith*, Fl. Brit. p. 992. E. B. t. 833.

HAB. Bogs and marshes on the sea-coast, rare. Coast between Starleyburn and Aberdour, Mr Chalmers. June. ♃.

Long-bracteated 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.

21. C. *distans*, sterile spikelet single, fertile ones suberect, 3–4, very remote, pedunculate, the sheaths of the foliaceous bracteas nearly as long as the peduncles; fruit ovate-acuminate, bifid at the apex; glumes mucronate. *Lightf.* p. 561. *Smith*, Fl. Brit. p. 992. *Hook* Fl. Scot. p. 267. E. B. t. 1234. *C. binervis, Smith*, Fl. Brit. p. 993. E. B. t. 1235.

HAB. Moors and heaths, common. Pentland Hills, very plentiful. June. ♃.

Distantly-spiked 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 beak 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.

22. C. *præcox*, spikelets approximate, sterile one single, fertile ones 2–3, ovate, very shortly pedunculate, sheaths of the foliaceous bracteas almost none; fruit ovate acute, pubescent; glumes ovate-acute, a little shorter than the fruit. *Hook.* Fl. Scot. p. 267. *Smith*, Fl. Brit. p. 994. E. B. t. 1099. *C. montana*, *Lightf.* p. 551.

HAB. Hilly pastures, common. King's Park, Mr Neill. May. ♃.

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.

23. C. *pilulifera*, spikelets approximate, sterile one single, linear, fertile ones roundish, sessile, approximate; glume mucronate, as long as the roundish, acute, pubescent fruit; culms weak. *Lightf.* p. 554. *Smith*, Fl. Brit. p. 995. *Hook.* Fl. Scot. p. 267. E. B. t. 885.

HAB. Moist hilly pastures and moors. King's Park, and Bevelaw Burn, Maughan. Braid Hill, Dr Graham. June. ♃.

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-acute 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.*

p. 558. *Smith*, Fl. Brit. p. 998. *Hook.* Fl. Scot. p. 267. E. B. t. 1505.

HAB. Bogs and marshy meadows, very common. June. ♃.

Pink-leaved Carex.—Root creeping. *Culm* about a foot high, erect, triangular, glabrous. *Leaves* very glaucous, shorter than the culm, linear-acuminate, roughish at the margin and keel. Occasionally there are 2 *sterile* spikelets. *Fertile spikelets* mostly 2, but not unfrequently 3, on peduncles about an inch in length, sheathed mostly about one-half, or rather less by the *bracteas*, the lowermost of which, rises as high as the spikelet it belongs to. *Fruit* rather lax, glabrous. *Glumes* ovate, obtuse, shorter than the fruit.

25. C. *recurva*, sterile spikelet single (sometimes 2), fertile ones oblongo-cylindrical, dense, pedunculate, at length pendulous; sheaths of the foliaceous bracteas scarcely any; fruit ovato-globose, pubescent, as long as the glumes. *Hook.* Fl. Scot. p. 268. *Smith*, Fl. Brit. p. 999. E. B. t. 1506.

HAB. Wet moors, and marshy pastures. King's Park; and Pentland Hills, abundant. June. ♃.

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.*

26. C. *cæspitosa*, digynous; sterile spikelet single, fertile ones 2–3, subsessile, oblongo-cylindrical, obtuse; bracteas foliaceous, auricled at the base; fruit persistent, broadly elliptical, longer than the black glumes. *Lightf.* p. 560. *Smith*, Fl. Brit. p. 1000. *Hook.* Fl. Scot. p. 268. E. B. t. 1507.

HAB. Bogs and marshy pastures, very common. June. ♃.

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.

27. C. *stricta*, digynous; sterile spikelet single (sometimes 2), fertile ones 2–3, cylindrical, subacuminate, subsessile, bracteas foliaceous, imperfectly auricled at the base; fruit deciduous, broadly ovate, compressed; culm very scabrous at the angles. *Hook.* Fl. Scot. p. 268. *Smith*, Fl. Brit. p. 1000. E. B. t. 914. *C. cæspitosa*, β, *Lightf.* p. 561.

HAB. Bogs and marshes, and stream-sides. Banks of the Water of Leith above Currie, Maughan. Marsh a little W. of N. Queensferry, G. Don. May, June. ♃.

Glaucous straight-leaved Carex.—Root very much creeping. *Leaves* 1–2 feet high or more, acutely triangular, and very scabrous. *Leaves* erect, nearly as long as the culm, very rough at the keel and margin. *Sterile spikelet* 1–2 inches long, not unfrequently there are 2; *fertile ones* 1–2 inches long, mostly somewhat elongate and acuminate, but sometimes cylindrical, and quite obtuse; this happens especially when there are no sterile flowers at the apex, which is sometimes the case. *Bracteas* rather short, either with small auricles at their base, or with the auricles prolonged into a scariose margin a short way up the bractea, or wanting altogether. *Fruit* and *glumes* much resembling the preceding, except that the latter are more lanceolate.

** *Sterile spikelets several;* (*in* C. lævigata *mostly solitary*).

† *Stigmas 2.*

28. C. *acuta*, digynous; sterile spikelets 2–3, fertile ones long, cylindrical, the uppermost mostly sterile at the apex, erect when in fruit; fruit densely imbricate, ovate-acute, entire at the apex. *Hook.* Fl. Scot. p. 269. *Smith*, Fl. Brit. p. 1001. E. B. t. 580.

HAB. Moist meadows and marshes. Duddingston Loch, on the south side, Mr Neill. 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.*

29. C. *paludosa*, glumes of the sterile spikelets obtuse, those of the fertile ones acutely lanceolate; bracteas sheathless, long and foliaceous; fruit ovate-acute, very slightly bidentate at the apex. *Hook.* Fl. Scot. p. 269. *Smith*, Fl. Brit. p. 1002. E. B. t. 807. *C. acuta*, β, *Lightf.* p. 566.

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.

30. C. *riparia*, glumes of the sterile spikelets acuminate, those of the fertile ones lanceolato-mucronate; bracteas sheathless, long and foliaceous; fruit oblongo-acute, forked at the apex. *Hook*, Fl. Scot. p. 269. *Smith*, Fl. Brit. 1003. E. B. t. 579. *C. acuta*, *Lightf.* p. 565.

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, ½–2 inches long, oblongo-cylindrical, the 2 lower ones pedunculate, the rest subsessile. *Fruit* densely imbricate, the teeth at the apex mostly divaricate.

31. C. *lævigata*, bracteas foliaceous, with sheaths shorter than the peduncles; sterile spikelets 1–2, fertile ones 3–5, somewhat drooping, oblong-cylindrical; fruit ovate, triquetrous, with a long bifid beak; glumes all mucronate. *Hook.* Fl. Scot. p. 269. *Smith*, Fl. Brit. p. 1005. E. B. t. 1387.

HAB. Bogs and marshy meadows. Cardenden, 4 miles NW. from Kirkcaldy, Mr Chalmers. June. ♃.

Smooth-stalked beaked Carex.—Root fibrous. *Culms* erect, 2–3 feet high, triquetrous, glabrous. *Leaves* broad, erect, bright green, glabrous. *Bracteas* foliaceous, as long as the culm, scabrous at the margin towards the summits. *Fertile spikelets* remote, pedunculate. *Fruit* ovato-lanceolate, triquetrous, not inflated, attenuated to a long, deeply bifid beak. *Glumes* lanceolate, with a scabrous, mucronate point, as long as, or a little shorter than the fruit.

32. C. *ampullacea*, fertile spikes suberect, long, cylindrical, the upper ones subsessile, the lower ones pedunculate; bracteas long, foliaceous, almost sheathless; fruit ovato-globose, inflated, with a subulate, minutely bifid beak. *Hook.* Fl. Scot. p. 270. *Smith*, Fl. Brit. p. 1006. E. B. t. 780. *C. vesicaria*, *Lightf.* p. 566.

HAB. Bogs and marshy meadows, frequent. Duddingston Loch; Meadowbank; marsh above Queensferry, Mr Neill. Hunter's Bog, Dr Graham. Pentland Hills, and Ravelrig-toll Moss, frequent. June. ♃.

Small-fruited Bladder Carex.—Roots creeping. *Culms* 1–2 feet high, erect, triangular, glabrous as far upwards as the lower spikelet. *Leaves* erect, narrow, longer than the culm, rough at the keel and margin. *Bracteas* foliaceous, rising above the culm. *Sterile spikelets* 3–4, filiform, approximate. *Fertile ones* 2–3, cylindrical, crowded with fruit, suberect, remote. *Fruit* yellowish, pale, patent, very dense, numerous, roundish, inflated, terminating rather suddenly in a subulate apex, which is slightly bifid.

33. C. *vesicaria*, fertile spikelets oblong or cylindrical, the uppermost subsessile, the lower ones pedunculate; bracteas long, foliaceous, sheathless; fruit patent, inflated, oblong, with a subulate, bifid beak. *Hook.* Fl. Scot. p. 269. *Smith*, Fl. Brit. p. 1005. E. B. t. 779. *C. inflata*, *Lightf.* p. 567.

HAB. Bogs, and marshy meadows and woods. Ravelrig-toll Moss. June. ♃.

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 bractea 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.

34. C. *hirta*, hairy; fertile spikelets remote, oblong, erect, pedunculate; bracteas foliaceous, with sheaths half the length of the peduncles; glumes mucronate, about as long as the ovate-acuminate, hairy fruit. *Lightf.* p. 568. *Smith*, Fl. Brit. p. 1007. *Hook.* Fl. Scot. p. 270. E. B. t. 685.

HAB. Bogs and moist woods. King's Park, Mr Yalden. Hunter's Bog, Mr Neill. Leith Links, Dr Graham. Corstorphine Hill. June. ♃.

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.

35. C. *filiformis*, sterile, spikelets terminal, filiform, fertile ones remote, ovate or oblong, subsessile; bracteas foliaceous, setaceous, subequal to the culm; fruit ovate-acute, bifid at the apex, very pubescent; glumes dark, mucronate. *Hook.* Fl. Scot. p. 270. *Smith*, Fl. Brit. p. 1008. E. B. t. 904. *C. tomentosa*, *Lightf.* p. 553.

HAB. Bogs and marshes, rare. Ravelrig-toll Moss, in the watery spots, very plentiful. June. ♃.

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*.

Lightf. p. 571. *Smith*, Fl. Brit. p. 1011. *Hook.* Fl. Scot. p. 271. E. B. t. 468.

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. ♃.

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.

Fertile flowers sessile, in the axils of the leaves, the germen inclosed by a rather irregularly-3-cleft perianth. *Style* long, filiform.

8. ALNUS.

(*Nat. Ord.* SALICINÆ, *Hook.* Scot. 2. p. 200.)

1. A. *glutinosa*, leaves roundish-cuneiform, obtuse, lobed, serrate, somewhat glutinous, downy in the axils of the veins beneath. *Lightf.* p. 576. *Hook.* Fl. Scot. p. 271. *Betula Alnus*, *Smith*, Fl. Brit. p. 1013. E. B. t. 1508.

HAB. Moist-woods, stream-sides, and bogs, common. May. ♄.

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 aments (catkins), on branched peduncles. *Stameniferous ament* cylindrical, pendulous, each floret with a calyx and corolla, the latter 4-cleft. *Stamens* 4, on very short filaments. *Pistiliferous ament* small, ovate, fine red, each floret with a simple perianth, the scales red.

9. URTICA.

(*Nat. Ord.* URTICEÆ, *Hook.* Scot. 2. p. 202.)

1. U. *urens*, leaves opposite, elliptical, about 5-ribbed; clusters of flowers nearly simple. *Lightf.* p. 578. *Smith*, Fl. Brit. p. 1015. *Hook.* Fl. Scot. p. 271. E. B. t. 1236.

HAB. Road-sides and waste places, very common. July—September. ☉.

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.

2. U. *dioica*, leaves opposite, cordate-acuminate; clusters of flowers mostly in pairs, much branched. *Lightf.* p. 578. *Smith*, Fl. Brit. p. 1016. *Hook.* Fl. Scot. p. 271. E. B. t. 1750.

HAB. Waste places, very common. July, August. ♃.

Great Nettle.—Root creeping. *Stems* 3–4 feet high. *Leaves* petiolate, scabrous, armed with stinging 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.)

1. C. *demersum*, fruit with three spines. *Lightf.* p. 580. *Smith*, Fl. Brit. p. 1020. *Hook.* Fl. Scot. p. 272. E. B. t. 947.

HAB. In ponds and ditches. Canonmills Loch, 1809, abundant, Mr Neill. July. ♃.

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.—Differs from *C. demersum* solely in the armed fruit.

11. MYRIOPHYLLUM.

(*Nat. Ord.* HALORAGEÆ, *Hook.* Scot. 2. p. 258.)

1. M. *spicatum*, flowers whorled, forming an interrupted leafless spike. *Lightf.* p. 581. *Smith*, Fl. Brit. p. 1021. *Hook.* Fl. Scot. p. 272. E. B. t. 83.

HAB. Ponds and ditches, frequent. Duddingston Loch, Mr Neill. July, August. ♃.

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. 190.)

1. A. *maculatum*, leaves all radical, hastato-sagittate, lobes deflexed; spadix club-shaped, obtuse, shorter than the spatha. *Lightf.* p. 528. *Smith*, Fl. Brit. p. 1024. *Hook.* Fl. Scot. p. 272. E. B. t. 1298.

HAB. Woods and hedges, rare about Edinburgh. Woods at Dalhousie, abundant; and at Bogsmill near Slateford, Maughan. April. ♃.

Cuckow-pint or *Wake-Robin.*—Root tuberous. *Plant* glabrous. *Leaves* all radical, large, shining, sometimes spotted. *Spatha* 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 acrid, 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. p. 2. 195.)

1. Q. *Robur*, leaves deciduous, obovate-oblong, sinuate and lobed, their sinuses rather acute, the lobes obtuse; fruit-stalks elongated. *Lightf.* p. 581. *Smith*, Fl. Brit. p. 1026. *Hook.* Fl. Scot. p. 273. E. B. t. 1342.

HAB. Woods and hedge-rows, frequent. ♄.

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.

2. Q. *sessiliflora*, leaves deciduous, petiolate, oblong, sinuate and lobed, the sinuses subopposite and somewhat acute; fruit sessile. *Hook.* Fl. Scot. p. 273. *Smith*, Fl. Brit. p. 1026. E. B. t. 1845.

HAB. Woods. Rosslyn woods, Maughan. ♄.

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.

(*Nat. Ord.* CORYLACEÆ, *Hook.* Scot. 2. p. 196.)

1. C. *vulgaris*, leaves oblong-lanceolate, acuminate, mucronato-serrate, glabrous on each side. *Hook.* Fl. Scot. p. 273. *Fagus Castanea*, *Smith*, Fl. Brit. p. 1027. E. B. t. 886.

HAB. Plantations. May. ♄.

Spanish Chesnut-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 chesnuts of the dessert in this country, and used as regular food in the south of Europe.

15. FAGUS.

(*Nat. Ord.* CORYLACEÆ, *Hook.* Scot. 2. p. 196.)

1. F. *sylvatica*, leaves ovate, glabrous, obsoletely dentate, ciliate. *Lightf.* p. 584. *Smith*, Fl. Brit. p. 1028. *Hook.* Fl. Scot. p. 274. E. B. t. 1846.

HAB. Woods and plantations, frequent. The Meadows, Mr Neill. May. ♄.

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.* SALICINÆ, *Hook.* Scot. 2. p. 201.)

1. B. *alba*, leaves ovato-deltoid, acute, doubly serrate, glabrous. *Lightf.* p. 572. *Smith*, Fl. Brit. p. 1012. *Hook.* Fl. Scot. p. 274. E. B. t. 2198.

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.

(*Nat. Ord.* CORYLACEÆ, *Hook.* Scot. 2. p. 196.)

1. C. *Betulus*, scales or bracteas of the fruit plane, oblong, serrated, 2-lobed at the base. *Lightf.* p. 585. *Smith*, Fl. Brit. p. 1029. *Hook.* Fl. Scot. p. 274. E. B. t. 2032.

HAB. Woods and hedges, occasionally. Hedges about Rosslyn. May. ♄.

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* 8–12. *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.

(*Nat. Ord.* CORYLACEÆ, *Hook.* Scot. 2. p. 195.)

1. C. *Avellana*, stipules oblong, obtuse; leaves roundish-cordate, acute; "involucre of the fruit campanulate, rather spreading, lacerate." (*Hook.*) *Lightf.* p. 586. *Smith*, Fl. Brit. p. 1030. *Hook.* Fl. Scot. p. 275. E. B. t. 723.

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.* CONIFERÆ, *Hook.* Scot. 2. p. 194.)

1. P. *sylvestris*, leaves in pairs, rigid; cones ovate-conical, acute, cernuous as long as the leaves, 1–3 together. *Lightf.* p. 587. *Smith*, Fl. Brit. p. 1031. *Hook.* Fl. Scot. p. 275. E. B. t. 2460.

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. DIŒCIA.

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

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* 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.

ovate, very pubescent, sessile; stigma nearly sessile. *Hook.* Fl. Scot. p. 278. *Smith*, Fl. Brit. p. 1041. E. B. t. 1359.

HAB. Banks of streams. Banks of the Water of Leith. Above Coltbridge. Banks of the Esk above Musselburgh, Maughan. April. ♄.

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 glaucous beneath. *Catkins* cylindrical, about ¾ths of an inch long, the scales orbicular, blackish.—Dr Hooker thinks *S. purpurea*, *Helix*, and the present one, varieties of the same species.

2. S. *triandra*, triandrous; leaves oblong-lanceolate, acute, serrate, glabrous; germens pedicellate, oblong-ovate, glabrous as well as the scale, the stigmas sessile, bifid. *Hook.* Fl. Scot. p. 278. *Smith*, Fl. Brit. p. 1044. E. B. t. 1435.

HAB. Marshes and banks of streams. Near Craigcrook, Maughan. April, May. ♄.

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, glaucous beneath. *Stipules* ovate, oblique, crenate, at length rounded and deflexed. *Catkins* yellow, erect, cylindrical, the scales yellow, obovate, obtuse, villose. *Stigmas* spreading, cleft.

3. S. *decipiens*, leaves lanceolate, serrate, very glabrous, the petiols subglandular; germens attenuate, pedicellate; branches smooth, and highly polished. *Hook.* Fl. Scot. p. 279. *Smith*, E. B. t. 1937.

HAB. Moist woods. Colinton woods, Maughan. May. ♄.

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 varnished; 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. *Germen* pedicellate, glabrous.

4. S. *Russelliana*, leaves lanceolate, tapering at each extremity, strongly serrate, glabrous, the petiols glandular; germens pedicellate, oblong-subulate, glabrous, style elongate; scales lanceolate, narrow, slightly ciliate. *Hook.* Fl. Scot. p. 279. *Smith*, Fl. Brit. p. 1045. E. B. t. 1808.

HAB. Marshes and willow-grounds. Common near Edinburgh, Maughan. Duddingston Loch, Mr Bainbridge. April, May. ♄.

Bedford Willow.—A tall tree of quick growth. *Branches* flexible and shining. *Leaves* petiolate, long, shining, glabrous, glaucous beneath. *Stipules* small, semi-cordate, toothed. *Fertile catkins* long, lax, erect, greenish. *Germen* much longer than the scale.

5. S. *fragilis*, leaves ovate-lanceolate, acute, serrate, glabrous; germens shortly pedicellate, ovate-oblong, glabrous, style elongate; scales pubescent, and much ciliate. *Lightf.*

p. 597. *Smith*, Fl. Brit. p. 1051. *Hook.* Fl. Scot. p. 279. E. B. t. 1807.

HAB. Banks of streams and moist hedge-rows. About Edinburgh less frequent than the preceding. Ravelrig-toll, Maughan. April, May. ♄.

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. *Germen* scarcely longer than the scale.

6. S. *pentandra*, pentandrous; leaves obovato-acuminate, glanduloso-crenate, glabrous; germens ovate-oblong, glabrous, subsessile, a little longer than the subpilose scale. *Lightf.* p. 593. *Smith*, Fl. Brit. p. 1046. *Hook.* Fl. Scot. p. 279. E. B. t. 1805.

HAB. Moist woods and banks of streams. Banks of the Esk and Water of Leith, and at Ravelrig-toll, Maughan. Rosslyn woods. May, June. ♄.

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.

7. S. *nigricans*, leaves obovate, (elliptical-lanceolate, *Sm.*) acute, crenato-serrate, glaucous and often downy beneath; germens pedicellate, lanceolate-subulate, very silky, the styles elongate, stigmas subentire; scales villous. *Hook.* Fl. Scot. p. 280. *Smith*, Fl. Brit. p. 1047. E. B. t. 1213.

HAB. Marshes and willow-grounds. Banks of the Esk, G. Don. Craigcrook, Maughan. April, May. ♄.

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.*

8. S. *arenaria*, leaves oblong-lanceolate, entire, downy, especially beneath; germens sessile, lanceolate, downy, with a very long style, the stigmas linear, often entire. *Hook.* Fl. Scot. p. 283. *Smith*, Fl. Brit. p. 1058. E. B. t. 1809, and according to Dr Hooker, *S. Stuartiana*, E. B. t. 2586.

HAB. Chiefly on mountains. Colinton woods, rare, G. Don. June. ♄.

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.

α. "leaves entire, elliptic-lanceolate, submucronulate, nearly naked above, glaucous and silky beneath, stem depressed." *Sm.* *S. repens, Smith*, Fl. Brit. p. 1061. E. B. t. 183. *S. arenaria, Lightf.* p. 604.

β. "leaves somewhat toothed, elliptic-oblong, acute, glabrous above, glaucous beneath and silky; petiols attenuated." (*Sm.*) *S. fusca, Smith*, Fl. Brit. p. 1060. E. B. t. 183.

HAB. Moors, heaths, and bogs, common. α. Drumshoreland Muir; Ravelrig-toll Moss; Pentland Hills. β. Ravelrig-toll Moss, Maughan. May. ♄.

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 smoothish 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.

10. S. *cinerea*, leaves obovate-elliptical, slightly downy above, beneath pubescent, glaucous, reticulated with veins, recurved at the margin; stipules semi-cordate; "germen pedicellate, lanceolate-subulate, silky, the style short, with subentire stigmas." *Hook.* Fl. Scot. p. 284. *Smith*, Fl. Brit. p. 1063. E. B. t. 1897., and, according to Dr Hooker, *S. aquatica*, E. B. t. 1437. and *S. oleifolia*, E. B. t. 1402.

HAB. Banks of streams, moist woods, and willow-grounds. Ravelrig-toll Moss, Maughan. Rosslyn woods. April. ♄.

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 *.

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* 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*,

11. S. *capræa*, leaves ovate, acute, the margin serrate and waved, downy and reticulated beneath; stipules semi-cordate; germens pedicellate, lanceolate-subulate, silky, the stigma sessile, undivided. *Lightf.* p. 607. *Smith*, Fl. Brit. p. 1067. *Hook.* Fl. Scot. p. 286. E. B. t. 1488.

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.

12. S. *acuminata*, leaves lanceolate-oblong, pointed, waved, slightly toothed, downy beneath; stipules reniform; fruit ovate, tapering. *Hook.* Fl. Scot. p. 286. *Smith*, Fl. Brit. p. 1068. E. B. t. 1434.

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.

13. S. *mollissima*, leaves lanceolate, obscurely crenate, whitish and silky beneath; stipules small, acute, semi-cordate at the base; germens lanceolato-subulate, very silky, shortly pedicellate, the style elongate, with deeply divided (mostly entire, *Hook.*) stigmas. *Hook.* Fl. Scot. p. 287. *Smith*, Fl. Brit. p. 1070. E. B. t. 1509.

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.

Smith, Fl. Brit. p. 1070. *Hook.* Fl. Scot. p. 287. E. B. t. 1898.

HAB. Marshes and osier-grounds, frequent. Rosslyn, &c. April, May. ♄.

Common Osier.—Branches very long, wand-like, silky. *Leaves* 6–8 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. *Germen* with an elongated style; stigmas slender, acute, entire.—The most useful osier. A large tree when allowed to grow.

15. S. *alba*, leaves elliptical-lanceolate, acute, regularly glanduloso-serrate, silky beneath, often also above; germens ovate-acuminate, subsessile, glabrous, the stigmas nearly sessile, short, recurved, bifid. *Lightf.* p. 610. *Smith*, Fl. Brit. p. 1071. *Hook.* Fl. Scot. p. 287. E. B. t. 2430. S. *cærulea*, E. B. t. 2431.

HAB. Moist coppices and osier-grounds, frequent. Rosslyn woods. May. ♄.

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. *Germen* glabrous.—There can be no question that Dr Hooker is right in identifying S. *cærulea* 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.* EMPETREÆ, *Nutt.*—Situation uncertain, *Hook.* Scot. 2. p. 297.)

1. E. *nigrum*, procumbent; leaves linear-oblong. *Lightf.* p. 612. *Smith*, Fl. Brit. p. 1072. *Hook.* Fl. Scot. p. 287. E. B. t. 526.

HAB. Mountains, frequent. Pentland Hills. May. ♄.

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.

(*Nat. Ord.* URTICEÆ, *Hook.* Scot. 2. p. 202.)

1. H. *Lupulus*.

Lightf. p. 615. *Smith*, Fl. Brit. p. 1077. *Hook.* Fl. Scot. p. 288. E. B. t. 427.

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.* SALICINÆ, *Hook.* Scot. 2. p. 200.)

1. P. *alba*, leaves roundish-cordate, lobed and toothed, downy and very white beneath; fertile catkins ovate; stigmas 4. *Lightf.* p. 616. *Smith*, Fl. Brit, p. 1079. *Hook.* Fl. Scot. p. 288. E. B. t. 1618.

HAB. Plantations, occasionally about Edinburgh. April. ♄.

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.

2. P. *tremula*, leaves nearly orbicular, broadly toothed, glabrous on both sides, the petiols compressed; stigmas 4, auricled at the base. *Lightf.* p. 616. *Smith*, Fl. Brit. p. 1081. *Hook.* Fl. Scot. p. 289. E. B. t. 1909.

HAB. Woods and hedges, frequent. Rosslyn woods. April. ♄.

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."

3. P. *nigra*, leaves deltoid, acute, serrate, glabrous on both sides; fertile catkins cylindrical, lax; stigmas 4. *Lightf.* p. 618. *Smith*, Fl. Brit. p. 1081. *Hook.* Fl. Scot. p. 289. E. B. t. 1910.

HAB. Woods and plantations, frequent. Rosslyn woods. April. ♄.

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.* EUPHORBIACEÆ, *Hook.* Scot. 2. p. 203.)

1. M. *perennis*, stem perfectly simple; leaves scabrous; root creeping, perennial. *Lightf.* p. 620. *Smith*, Fl. Brit. p. 1083. *Hook.* Fl. Scot. p. 289. E. B. t. 1872.

HAB. Moist woods and shady places, very common. April, May. ♃.

Perennial Mercury.—Stems about a foot high, chiefly leafy towards the summit. *Leaves* ovate, acute, opposite, petiolate, serrate, dark green. *Flowers* green, very small, in axillary, pedunculate, erect recemes. *Fruit* setoso-scabrous.—Supposed to be poisonous.

2. M. *annua*, stem branched, branches opposite; leaves glabrous; root fibrous, annual. *Lightf.* p. 621. *Smith*, Fl. Brit. p. 1084. *Hook.* Fl. Scot. p. 290. E. B. t. 559.

HAB. Woods and waste places, not frequent. Burntisland, Lightfoot. August. ☉.

Annual Mercury.—Glabrous, fœtid, dark green. *Stem* a foot high, more or less branched. *Leaves* ovate, acute, serrate. *Flowers* green, in axillary racemes. *Fruit* minutely prickly.

6. HYDROCHARIS.

(*Nat. Ord.* HYDROCHARIDEÆ, *Hook.* Scot. 2. p. 187.)

1. H. *Morsus Ranæ.*

Lightf. p. 622. *Smith*, Fl. Brit. p. 1084. *Hook.* Fl. Scot. p. 299. E. B. t. 808.

HAB. Ditches and lakes, rare. July. ♃.

Common Frog-bit.—Plant floating, glabrous, stoloniferous, sending down long simple roots into the mud. *Leaves* petiolate, reniform, entire, mostly purplish beneath. *Flowers* in a sort of umbel, one flower only expanding at a time; the peduncles arising from an erect, 2-leaved, membranaceous involucre. *Flowers* an inch in diameter, beautiful, delicate, white. *Petals* 3, evanescent.

VI. MONADELPHIA.

7. JUNIPERUS.

(*Nat. Ord.* CONIFERÆ, *Hook.* Scot. 2. p. 195.)

1. J. *communis*, leaves ternate, spreading, mucronate, longer than the mature fruit. *Lightf.* p. 613. *Smith*, Fl. Brit. p. 1085. *Hook.* Fl. Scot. p 290. E. B. t. 1100.

HAB. Mountainous heaths. Pentland Hills, abundant. May. ♄.

Common Juniper.—A shrubby plant, 1–4 feet high, with spreading branches, thickly clothed with prickly, linear glabrous leaves. *Flowers* in very small, sessile, axillary catkins. *Berries* globose, blueish black, with a peculiar turpentine-like flavour. *Seeds* 3.—Leaves fragrant when bruised. Berries employed in the distillation of Geneva.

XXIII. POLYGAMIA.

I. MONŒCIA.

1. ATRIPLEX.

(*Nat. Ord.* CHENOPODEÆ, *Hook.* Scot. 2. p. 208.)

1. A. *portulacoides*, stem shrubby; leaves ovate-lanceolate,

entire. *Lightf.* p. 635. *Smith*, Fl. Brit. p. 1090. *Hook.* Fl. Scot. p. 291. E. B. t. 261.

HAB. Sea-coast, in muddy places, rare. Leith, Sibbald. August. ♄.

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.

2. A. *laciniata*, stem herbaceous, diffuse; leaves ovate-deltoid, angulato-dentate, extremely farinose beneath. *Lightf.* p. 626. *Smith*, Fl. Brit. p. 1090. *Hook.* Fl. Scot. p. 291. E. B. t. 165.

HAB. Sea-shores. Beach at Caroline Park; Inchcolm, Mr Neill. Newhaven, Sir J. E. Smith. Behind Fisherrow, Maughan. August. ☉.

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 petiol, unequally dentato-laciniate, beautifully frosted. *Flowers* axillary, 2–3 together. *Perianth* of the fruit much enlarged, denticulate or tuberculate, enclosing a compressed seed.

3. A. *patula*, stem herbaceous, with very spreading branches; leaves triangular, prostrate, glabrous above, irregularly toothed; the upper ones entire; perianth of the fruit more or less tuberculate at the sides. *Hook.* Fl. Scot. p. 291. *Smith*, Fl. Brit. p. 1091. E. B. t. 936. A. *hastata*, *Lightf.* p. 636.

HAB. Waste places, very frequent. Fields about Edinburgh, Mr Neill. July. ☉.

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.

4. A. *angustifolia*, stem herbaceous, spreading; leaves lanceolate, entire, the lower ones somewhat hastate; perianth of the fruit hastate, slightly tuberculate at the sides. *Hook.* Fl. Scot. p. 291. *Smith*, Fl. Brit. p. 1092. E. B. t. 1774. A. *patula*, *Lightf.* p. 637.

HAB. Waste places, frequent. July. ☉.

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-

tire or toothed; perianth of the fruit sinuate and muricate. *Lightf.* p. 638. *Smith*, Fl. Brit. p. 1094. *Hook.* Fl. Scot. p. 292. E. B. t. 708. A. *marina*, *Lightf.* p. 637.

HAB. Sea-shores. About Dysart Rock, Lightfoot. East of Caroline Park; Guillon Loch, G. Don. July. ⊙.

Grass-leaved Sea-Orache.—Stem erect, 1–2 feet high, angular and striate, 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 *.

I. EQUISETACEÆ. *Rich.*

1. EQUISETUM †.

** Fertile stems simple.*

1. E. *arvense*, sterile stems somewhat decumbent, with simple, tetragonous, scabrous branches; fertile ones erect, simple, their sheaths few, cylindrical, inciso-dentate. *Lightf.* p. 647. *Smith*, Fl. Brit. p. 1103. *Hook.* Fl. Scot. 2. p. 161. E. B. t. 2020

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.

2. E. *fluviatile*, sterile stems with very numerous, long, simple, roughish octagonal branches; fertile ones simple, with many infundibuliform, lacerato-dentate sheaths, their teeth mucronato-setaceous. *Lightf.* p. 649. *Smith*, Fl. Brit. p. 1104. *Hook.* Fl. Scot. 2. p. 161. E. B. t. 2022.

HAB. Moist banks and stream-sides. Lower end of Lasswade Paper-mill, Mr Neill. Rosslyn woods. May, June. ♃.

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* 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.

3. E. *hyemale*, stems all simple, erect, closely scabrous, the sheaths short, whitish, black at the base and margin, which is at length crenate. *Lightf.* p. 650. *Smith*, Fl. Brit. p. 1105. *Hook.* Fl. Scot. 2. p. 161. E. B. t. 915.

HAB. Marshy woods. Rosslyn and Colinton woods, Maughan. Dalkeith, and between Lasswade and Mavis Bank, Sir J. E. Smith. July, August. ♃.

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.*

4. E. *limosum*, stems branched upwards, (sometimes simple), the branches few, short, simple, pentagonous, glabrous; spike oblong. *Lightf.* p. 648. *Smith*, Fl. Brit. p. 1105. *Hook.* Fl. Scot. 2. p. 161. E. B. t. 929.

HAB. Marshes and ditches, frequent. Rosslyn, Mr Neill. Duddingston Loch, Mr Yalden. Ravelrig-toll Moss, abundant. June, July. ♃.

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 curvilineal 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.

mostly in imperfect whorls. *Spike* brown, ovate or oblong, seldom an inch long.

5. E. *palustre*, stems deeply furrowed, glabrous, branched, the branches simple, pentagonous, curved upwards; spike oblong, blackish. *Lightf.* p. 648. *Smith*, Fl. Brit. p. 1103. *Hook.* Fl. Scot. 2. p. 161. E. B. t. 2021.

HAB. Ditches and marshes, frequent. Duddingston Loch, Mr Bainbridge. June, July. ♃.

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.

6. E. *sylvaticum*, branches of both the sterile and fertile stems compound, curved downwards, scabrous; sheaths deeply cleft into broad membranaceous segments. *Lightf.* p. 646. *Smith*, Fl. Brit. p. 1102. *Hook.* Fl. Scot. 2. p. 161. E. B. t. 1874.

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. ♃.

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. MARSILIACEÆ. *Br.*

2. PILULARIA.

1. P. *globulifera.*

Lightf. p. 683. *Smith*, Fl. Brit. p. 1143. *Hook.* Fl. Scot. 2. p. 160. E. B. t. 521.

HAB. Marshes, rare. Braid Hill marshes, and Pentland Hills, Mr Arnott. June, July. ♃.

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 *germens* 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. LYCOPODINEÆ. *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. *Smith*, Fl. Brit. p. 1108. *Hook.* Fl. Scot. 2. p. 159. E. B. t. 224.

Hab. Alpine moors and heaths. Pentland Hills by the old reservoir, and in other places. July, August. ♃.

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 heighth. *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.

2. L. *alpinum*, stems prostrate, throwing up fasciculated, subdichotomous branches; leaves quadrifarious, oblong-acute, imbricate; spikes terminal, short, solitary, sessile. *Lightf.* p. 690. *Smith*, Fl. Brit. p. 1112. *Hook.* Fl. Scot. 2. p. 159. E. B. t. 234.

Hab. Mountains. Pentland Hills, Sir J. E. Smith, (not frequent.) July, August. ♃.

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.

3. L. *selaginoides*, stem filiform, creeping, branches suberect, the flowering ones simple, terminating in a leafy spike; leaves ciliate with distant spinose teeth. *Lightf.* p. 686. *Smith*, Fl. Brit. p. 1109. *Hook.* Fl. Scot. 2. p. 159. E. B. t. 1148.

Hab. Moist places on the mountains. Pentland Hills, Mr Neill, (not frequent.) August. ♃.

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.

4. L. *Selago*, stems erect, fastigiate, branched dichotomously; leaves linear-lanceolate, pungent, entire, imbricated, rigid; capsules axillary, not in a spike. *Lightf.* p. 687. *Smith*, Fl. Brit. p. 1111. *Hook.* Fl. Scot. 2. p. 159. E. B. t. 233.

Hab. Rocky moist places on the mountains. Pentland Hills on the rocks above Swanston Wood. June—August. ♃.

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 subequal 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. *Br.*

DIV. I. *Capsules* 1-*celled, adnate at the base, opaque, without a ring, semi-bivalved.* OPHIOGLOSSEÆ.—*(Fructification pedunculate; stem in the British species with a single lateral frond.)*

4. OPHIOGLOSSUM.

1. O. *vulgatum*, spike of fructification pedunculate; frond ovate, obtuse. *Lightf.* p. 651. *Smith*, Fl. Brit. p. 1106. *Hook.* Fl. Scot. 2. p. 158. E. B. t. 108.

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, subsessile 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.

1. B. *Lunaria*, spike of fructification pedunculate; frond pinnate, the pinnules lunate, crenate. *Hook.* Fl. Scot. 2. p. 158. *Osmunda Lunaria*, *Lightf.* p. 652. *Smith*, Fl. Brit. p. 1107. E. B. t. 318.

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.* GYRATÆ, Br.

6. BLECHNUM.

1. B. *boreale*, sterile fronds pinnatifid, the segments lanceolate, rather obtuse, parallel, fertile ones pinnate, the pinnæ linear-acuminate. *Hook.* Fl. Scot. 2. p. 157. *Smith*, Fl. Brit. p. 1135. E. B. t. 1159. *Osmunda spicant*, *Lightf.* p. 654.

HAB. Woods and moorish banks, frequent. Pentland Hills in great profusion. July. ♃.

Northern Blechnum.—Root black and scaly. *Fronds* 6–18 inches high, erect, lanceolate, dark green. *Pinnæ* very numerous, somewhat alternate, entire. *Lines* of *fructification* nearer to the mid-rib than the margin of the pinnæ.

7. PTERIS.

1. P. *crispa*, sterile frond bipinnate, the pinnules pinnatifid, with obovate, crenate segments; fertile one bipinnate, tripinnate below, the pinnules linear-oblong, entire, narrowed at the base. *Hook.* Fl. Scot. 2. p. 156. *Smith*, Fl. Brit. p. 1137. E. B. t. 1160. *Osmunda crispa*, *Lightf.* p. 655.

HAB. Stony places on the mountains. Salisbury Craigs, Mr J. Stewart. (I fear there is some mistake connected with this station.) July. ♃.

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.

2. P. *aquilina*, frond 3-partite, branches bipinnate, the pinnæ linear-lanceolate, upper ones undivided, lower ones pinnatifid, the segments oblong, obtuse. *Lightf.* p. 657. *Smith*, Fl. Brit. p. 1136. *Hook.* Fl. Scot. 2. p. 156. E. B. t. 1679.

HAB. Woods and heaths, common. July. ♃.

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*.

Hook. Fl. Scot. 2. p. 156. *Smith*, Fl. Brit. p. 1133. E. B. t. 1150. *Asplenium Scolopendrium*, *Lightf.* p. 660.

HAB. Moist shady rocky places. Not frequent near Edinburgh. Roof of the Chapel at Rosslyn. Rocks west from Swanston, Pentland Hills, Mr Neill. July. ♃.

Common Hart's-tongue.—Fronds suberect, on rather short stalks, 8–16 inches long, ligulate, entire, acute, cordate 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.

1. A. *septentrionale*, fronds mostly trifid, tapering down into a long stipes, the segments acutely and deeply toothed towards the apex. *Hook.* Fl. Scot. 2. p. 155. *Smith*, Fl. Brit. p. 1129. E. B. t. 1017. *Acrostichum septentrionale*, *Lightf.* p. 656.

HAB. Clefts of rocks, rare. Frequent on rocks in the King's Park, Lightfoot. Braid Hermitage, Sir J. E. Smith. Blackford Hill, Maughan. June—October. ♃.

Forked Spleenwort.—Plant gowing 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.

2. A. *marinum*, fronds pinnate, the pinnæ oblong, obtuse, inciso-serrate, upper margin at the base rounded and subauriculate, the lower truncate. *Lightf.* p. 664. *Smith*, Fl. Brit. p. 1128. *Hook.* Fl. Scot. 2. p. 155. E. B. t. 392.

HAB. Rocks at the sea-side, rare. Coves at Weems, Fifeshire, Lightfoot. Rocks near Queensferry, Maughan. June—October. ♃.

Sea Spleenwort.—Fronds 3–12 inches long, lanceolate, the stipes generally dark purple, glabrous, shining. *Pinnæ* patent, the serratures rounded. *Lines* of *fructification* linear-oblong, oblique, distinct, on both sides of the midrib.

3. A. *Trichomanes*, fronds pinnate, pinnæ roundish-oblong, obtuse, crenate, the base truncate and somewhat wedge-shaped; stipes dark coloured. *Lightf.* p. 662. *Smith*, Fl. Brit. p. 1126. *Hook.* Fl. Scot. 2. p. 155. E. B. t. 576.

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 pinnate. Some of the lowermost pinnæ remote, and of a rounder form than the others. *Lines* of *fructification* 6-8, minute, oblong, oblique, distinct.

4. A. *Ruta-muraria*, fronds bipinnate at the base, simply so at the apex, pinnules rhomboidal-oblong, obtuse, denticulate at the apex. *Lightf.* p. 665. *Smith*, Fl. Brit. p. 1130. *Hook.* Fl. Scot. 2. p. 156. E. B. t. 150.

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, pinnæ oblong-lan-

ceolate, acute, pinnules oblong, cut in a pinnatifid manner, the segments toothed at the apex; sori at length confluent. *Lightf.* p. 666. *Smith*, Fl. Brit. p. 1131. *Hook.* Fl. Scot. 2. p. 156. E. B. t. 1950.

HAB. Banks and clefts of rocks in shady places. King's Park, Mr Neill. June—October. ♃.

Black Maidenhair Spleenwort.—Fronds growing in lax tufts, 4–16 inches long, the general outline being broadly lanceolate. *Stalks* reddish, glabrous, smooth, shining. The *frond* is more or less divided according to its size; the small ones being merely pinnate, and the pinnæ pinnatifid; the large ones agreeing with the specific character. *Lines* of *fructification* rather numerous, minute, oblong, when young covered with a silvery involucre; at length confluent.

10. ASPIDIUM.

* *Involucres bursting laterally.*

1. A. *fragile*, fronds bipinnate, pinnules oblong, obtuse, inciso-serrate or subpinnatifid, the segments subentire; rachis winged. *Hook.* Fl. Scot. 2. p. 155, and *A. regium. Cyathea fragilis*, *Smith*, Fl. Brit. p. 1139. E. B. t. 1587, et *C. incisa*, t. 163. *Polypodium fragile*, *Lightf.* p. 677.

HAB. Moist rocks chiefly on the mountains. Pentland Hills occasionally. June, July. ♃.

Brittle Fine-leaved Aspidium.—Fronds growing in lax tufts, 6–14 inches long, the stalks long, slender, very brittle. *Frond* delicate, fine green, lanceolate, pinnate; lowermost pinnæ somewhat remote, and smaller than those immediately above them; pinnules variously 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.

2. A. *Filix fœmina*, fronds bipinnate, pinnules oblong-lanceolate, inciso-serrate, the serratures few-toothed, somewhat acute; sori oblong, straight. *Hook.* Fl. Scot. 2. p. 155. *Smith*, Fl. Brit. p. 1124. E. B. t. 1459. *Polypodium Fil. fœm. Lightf.* p. 673.

HAB. Moist shady places, frequent. King's Park, Mr Yalden. Ravelston Wood, Mr Neill. Rosslyn and Auchindenny woods. June, July. ♃.

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. *Pinnæ* 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 bipinnate, pinnules oblong, distinct,

inciso-pinnatifid, the segments mucronate-serrate; stipes chaffy. *Hook.* Fl. Scot. 2. p. 154. *Smith*, Fl. Brit. p. 1125. E. B. t 1461. *Polypodium cristatum*, *Lightf.* p. 670. *A. spinulosum*, E. B. t. 1460.

HAB. Woods and moist rocky places, frequent. June, July. ♃.

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 pinnæ horizontal, and the lower ones so long as to render the form of the frond triangular.

4. A. *lobatum*, frond bipinnate, pinnules ovate, obtuse, the apex aristate, mucronato-serrate, auriculate above at the base; stipes and rachis chaffy. *Hook.* Fl. Scot. 2. p. 154. *Smith*, Fl. Brit. p. 1123. E. B. t. 1563.

HAB. Rocky shady woods. Rosslyn woods, Maughan. Arniston woods. June. ♃.

Close-leaved prickly Shield-fern.—Fronds rigid, lanceolate, acute, 1–2 feet high, alternately pinnate; *pinnæ* lanceolate, acute, almost horizontal, pinnulate or subpinnulate. "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 *pinnules* 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.*

5. A. *aculeatum*, fronds bipinnate, pinnules ovate, subfalcate, acute mucronate-serrate, truncate above at the base, abruptly cuneate below; stipes and rachis chaffy. *Hook.* Fl. Scot. 2. p. 154. *Smith*, Fl. Brit. p. 1122. E. B. t. 1562. *Polypodium aculeatum*, *Lightf.* p. 675.

HAB. Shady rocky places. Rosslyn woods, Mr Neill. June. ♃.

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. *Pinnules* mostly alternate, ovate, a little curved into a crescent-shape, sharply serrate, each tooth tipped with a spine; all the pinnules 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.

†† *Pinnules obtuse, destitute of mucronate points.*

6. A. *Filix mas*, fronds bipinnate, pinnules oblong, obtuse, serrate, the serratures not spinulose; sori approximate to the midrib; stipes and rachis chaffy. *Hook.* Fl. Scot. 2. p. 154.

Smith, Fl. Brit. p. 1121. E. B. t. 1458. *Polypodium Filix mas*, *Lightf.* p. 671.

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. *Pinnæ* alternate, linear-lanceolate, acuminate, pinnulate; *pinnules* spreading, oblong, close, serrate, the serratures fine at the rounded apex. *Sori* large, reddish-brown, in two rows, one on each side the nerve.

7. A. *Oreopteris*, fronds pinnate, pinnæ lanceolate, glabrous, pinnatifid, resinoso-glandulose beneath, the segments oblong, very obtuse, entire; sori marginal. *Hook.* Fl. Scot. 2. p. 154. *Smith*, Fl. Brit. p. 1120. E. B. t. 1019.

HAB. Banks in moorish situations. Pentland Hills, Mr Neill. Banks of Bevelaw Burn, &c. July. ♃.

Heath Shield-fern.—Fronds two feet high or more, tufted, regularly pinnate, the stipes and rachis chaffy; *pinnæ* 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.

1. P. *vulgare*, fronds deeply pinnatifid, segments linear-lanceolate, obtuse, crenulate, approximate, the upper ones gradually smaller; sori solitary; stipes chaffy. *Lightf.* p. 667. *Smith*, Fl. Brit. p. 1113. *Hook.* Fl. Scot. 2. p. 152. E. B. t. 1149.

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* 6–18 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.

2. P. *Phegopteris*, fronds bipinnate, the 2 lower pinnæ deflexed, segments linear-lanceolate, obtuse, entire, ciliate, those next to the main rachis adnato-decurrent; veins hairy; sori solitary, marginal. *Lightf.* p. 669. *Smith*, Fl. Brit. p. 1116. *Hook.* Fl. Scot. 2. p. 153. E. B. t. 2224.

HAB. Woods and banks in heathy places. Arniston woods, and by the side of Bevelaw Burn, Maughan. June, July. ♃.

Pale mountain Polypody.—Root creeping. *Fronds* about 1 foot high, including the long, slender, chaffy stalks; pale delicate green. *Pinnæ* 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.

3. P. *Dryopteris*, fronds ternate, bipinnate, spreading and deflexed, the segments obtuse, subentire; sori marginal; root filiform, creeping. *Lightf.* p. 678. *Smith*, Fl. Brit. p. 1116. *Hook.* Fl. Scot. 2. p. 153. E. B. t. 616.

HAB. Shady stony places. Birch thicket near Logan House, Pentland Hills, Mr Neill. Arniston; Rosslyn; and Auchindenny woods. Habbie'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; *pinnæ* sessile, lanceolate, rather remote, 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.)

1. A. *rupestris;* stems branched; leaves nerveless, ovate, gradually acuminate, the upper ones falcate. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 2. t. 8. *Hook.* in Linn. Trans. v. 10. p. 391. t. 31. f. 2. *Smith*, E. B. t. 1277.

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.

2. A. *Rothii*, stems almost simple; leaves nerved, lanceolate-subulate, falcato-secund, fragile; perichætial ones oblong, nerveless, their margins involute. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 2. t. 8. *Hook.* in Linn. Trans. v. 10. p. 393. t. 31. f. 3. *Smith*, E. B. t. 2162.

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 whitish 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.)

1. S. *obtusifolium*, branches tumid; leaves ovate, obtuse. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit* p. 3. t. 4. S. *latifolium*, *Smith*, E. B. t. 1405.

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* 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. *Thecæ* 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.

2. S. *squarrosum*, branches attenuated at their extremities; leaves ovate-acuminate, squarrose, recurved. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 4. t. 4. *Smith*, E. B. t. 1498.

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. *Thecæ* 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.

3. S. *acutifolium*, branches attenuated; leaves ovate-lanceolate, crowded. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 4. t. 4. S. *capillifolium*, *Smith*, E. B. t. 1406.

Hab. Bogs, extremely common.

Stems forming dense wide tufts, frequently tinged with pink, 3–18 inches long, slender, not much branched. *Branches* slender, deflexed. *Leaves* crowded, imbricated, acute, varying somewhat in their degree of acumination; when growing in water, approaching to the following. *Thecæ* 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*.

4. S. *cuspidatum*, branches attenuated; leaves lanceolate-subulate, lax. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 4. t. 4. *Smith*, E. B. t. 2392.

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. *Thecæ* 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.

14. PHASCUM.

(Most of the species of this genus are excessively minute; all grow on the ground.)

* *Leaves lanceolate or subulate.*

1. P. *serratum*, perichætial leaves lanceolate, serrate, nerveless; conferva-like, creeping, branched and jointed shoots springing from the base. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 5. t. 5. *Smith*, E. B. t. 465. and Ph. *stoloniferum*, t. 2006.

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. *Perichætial leaves* erect, serrate, reticulate. *Theca* small, ovate, acute, subsessile, containing about 100 seeds.—The most minute British moss.

2. P. *crispum*, leaves lanceolate-subulate, flexuose, crisped when dry. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 6. t. 5. *Smith*, E. B. t. 1680. and P. *multicapsulare*, t. 618.

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.

3. P. *subulatum*, leaves subulate-setaceous, straight, their nerve disappearing below the point. *Hook.* Fl. Scot. 2. p. 121. *Musc. Brit.* p. 6. t. 5. *Smith*, E. B. t. 2177.

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.

4. P. *axillare*, leaves lanceolate-subulate, straight, their nerve disappearing below the point; theca at length lateral. *Hook.* Fl. Scot. 2. p. 122. *Musc. Brit.* p. 7. t. 5. *Smith*, E. B. t. 1036. P. *strictum*, E. B. t. 2093.

HAB. Moist banks. Occasionally about Edinburgh.

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

terminating in a more or less rigid coloured point. *Hook.* Fl. Scot. 2. p. 122. and *Musc. Brit.* p. 8. t. 5. exclud. var. β. *Smith*, E. B. t. 2025. Ph. *schreberianum*, E. B. t. 2026.

HAB. Moist shady banks. Abundant about Edinburgh.

Plant of a pleasant green colour, growing in tufts often widely spreading, ¼th or ½ 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.

6. P. *piliferum*, leaves obovate-acute or oblong, the nerve ending in a lax pellucid hair. *Schreb.* de *Phasc.* p. 8. t. 1. f. 6.–10. *Smith*, E. B. t. 1888. Ph. *cuspidatum*, β. *Musc. Brit.* p. 8. Ph. *curviseta*, E. B. t. 2259.

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.*

7. P. *rectum*, leaves ovate, with a short point; theca globose, seta nearly erect. *Musc. Brit.* p. 9. t. 5. *Smith*, E. B. t. 330. Ph. *curvicollum*).

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, suberect. *Seta* nearly twice as long as the leaves, suberect. *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.*

1. G. *rupestre*, leaves linear-subulate, the uppermost ones crisped when dry; theca ovate, pale brown when old, the lid obliquely rostrate, "shorter than the theca," (*Hook.*) *Schwæg* Suppl. t. 11. *Hook.* Fl. Scot. 2. p. 122. and *Musc. Brit.* p. 11. in part, (not the figure). G. *æruginosum*, *Smith*, E. B. t. 2200.

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. *curvirostum*.—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 curved 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 curved, 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 chesnut. *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.

3. G. *viridissimum*, leaves broadly lanceolate; theca ovate, furrowed, the lid obliquely rostrate. *Hook.* Fl. Scot. 2. p. 122. *Musc. Brit.* p. 10. t. 6. *Smith*, E. B. t. 1583. *Grimmia? Forsteri*, E. B. t. 2225.

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. Scotica* of Dr Hooker was published,

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* Since the above was written, I have received the following characters from Dr Hooker.

G. *rupestre*, "foliis lineari-subulatis, patentibus, flexuosis, siccitate tortilibus, capsula ovata, operculo conico-rostrata capsula breviore."

G. *curvirostrum* "foliis lanceolato-subulatis, erectis, rigidis, siccitate 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 yellow 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.

Captain Carmichael has also discovered this moss on rocks near Appin. In England it is confined to trees.

** *Stems short, simple.*

4. G. *ovatum*, leaves ovate, erect, concave, piliferous, their nerve furnished with a granuliferous membrane; lid of the theca rostrate *Hook.* Fl. Scot. 2. p. 122. *Musc. Brit.* p. 11. t. 7. *Smith*, E. B. t. 1889.

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 β. *gracile* of the *Muscologia Britannica*, and occasionally found about Edinburgh.

5. G. *truncatulum*, leaves obovate, apiculate, patent, nearly plane; lid obliquely rostrate. *Hook.* Fl. Scot. 2. p. 122. *Musc. Brit* p. 12. t. 7. *Smith*, E. B. t. 1975. G. *intermedium*, E. B. t. 1976.

β. *ramosum*, stem branched, all the branches producing fruit.

HAB. Banks and stubble-fields, very common. β. 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. β. differs from the common form, in being often much branched and elongated.—I have specimens gathered near Edinburgh, ¾ths of an inch high, with from 6–12 thecæ, each terminating a separate branch.

6. G. *Hiemii*, leaves lanceolate, serrate at the point; theca ovate-oblong, the lid obliquely rostrate. *Hook.* Fl. Scot. 2. p. 123. *Musc. Brit.* p. 12. t. 7. *Smith*, E. B. t. 1951. G. *obtusum*, E. B. t. 1407.

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. *Columella* long, and retaining the lid after it has separated from the theca.

7. G. *fasciculare*, leaves oblong-lanceolate, acuminate, nearly plane, subserrate, marginate; theca pyriform, the lid plane, submammillate. *Hook.* Fl. Scot. 2. p. 123. *Musc. Brit.* p. 12. t 7. *Smith*, E. B. t. 1245.

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.

8. G. *pyriforme*, leaves obovate-acuminate, concave, serrate, not marginate; theca roundish-obovate, the lid convex, shortly rostrate. *Hook.* Fl. Scot. 2. p. 123. *Musc. Brit.* p. 13. t. 7. *Smith*, E. B. t. 413.

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.

9. G. *tenue*, stem scarcely any; outer leaves very short, ovate-lanceolate, inner ones linear-lanceolate, all erect, obtuse, with a strong nerve disappearing below the summit; theca oblong. *Hook.* Fl. Scot. 2. p. 123. *Musc. Brit.* p. 13. t. 7. *G. paucifolium*, *Smith*, E. B. t. 2506.

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 heighth. *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.

10. G. *microstomum*, leaves broadly subulate, their margin involute above, flexuose, crisped when dry; theca elliptical, contracted at the mouth, the lid subulate, incurved. *Hook.* Fl. Scot. 2. p. 123. *Musc. Brit.* p. 13. t. 7. *Smith*, E. B. t. 2215.

HAB. Banks and turf-capped walls. Banks near Kinghorn, Mr Arnott. King's Park.

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 mitriform calyptra, and grows on rocks and stones in subalpine stations.)

1. A. *ciliatum*, leaves ovate, lengthened out and diaphanous

at the points; those of the perichætium laciniated at their extremity. *Hook.* Fl. Scot. 2. p. 123. *Musc. Brit.* p. 14. t. 6. *Gymnostomum ciliatum*, *Smith*, E. B. t. 1179.

HAB. Mountain rocks and stones. Arthur's Seat, and on the Pentland Hills.

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 perichætial 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 *Musc. Brit.*, and *Gymnost. imberbe* of E. B. t. 2237.

17. TETRAPHIS.

1. T. *pellucida*, stems elongated, leaves ovate-acuminate, those of the perichætium lanceolate; theca cylindrical. *Hook.* Fl. Scot. 2. p. 124. *Musc. Brit.* p. 16. t. 8. *Smith*, E. B. t. 1020.

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. *Seta* half an inch long. *Theca* pale yellowish-brown, erect. *Peristome* of 4 long erect teeth. More common than the fruit, are little cup-shaped receptacles produced on distinct plants, containing gemmæ, or minute roundish, reproductive bodies, bearing an exact analogy, as Dr Hooker has observed, to the anthers of the *Jungermanniæ*.—A singular genus. *Calyptra* resembling that of an *Orthotricum*. The four teeth are remarkably large for the size of the theca; according to Mr Brown, each of them is marked by seven longitudinal striæ, 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 *Orthotricum*. See *Brown* in *Linn. Trans.* 12. p. 579, and *Hook.* in *Fl. Lond.* New Series.

2. T. *Browniana*, stems very short; leaves few, linear, slightly incrassated upwards, those of the perichætium ovate, obtuse; theca ovate. *T. ovata*, *Hook.* Fl. Scot. 2. p. 124. *Musc. Brit.* p. 17. t. 8. *Bryum Brownianum*, *Dicks.* *Grimmia Browniana*, *Smith*, E. B. t. 1422. (very bad and incorrect.)

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 perichætium, give a peculiar, minutely-bristly appearance to the surface, on which the plant grows, (usually in a crowded manner.) *Perichætial 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 Schwaegrichen, and really to want the linear-leaves.

18. SPLACHNUM.

(All the species agree in a strikingly vasculose structure, and in the columella being longer than the theca, and capitate. They grow, some on dung, others on the ground, chiefly in mountainous countries.)

1. S. *ampullaceum*, leaves ovate-lanceolate, acuminate, serrate; apophysis inversely flagon-shaped, twice as wide as the theca. *Hook.* Fl. Scot. 2. p. 125. *Musc. Brit.* p. 20. t. 9. *Smith*, E. B. t. 144, and *S. Turnerianum*, t. 1116.

HAB. 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 *Splachna*, but very rare about Edinburgh.

19. CINCLIDOTUS.

1. C. *fontinaloides*.

Hook. Fl. Scot. 2. p. 127. *Musc. Brit.* p. 29. t. 11. *Fontinalis minor*, *Smith*, E. B. t. 557.

HAB. 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. *Thecæ* on very short setæ, 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.*

1. T. *muralis*, stems short; leaves patent, linear-oblong, their margins recurved; nerve produced beyond the leaf into a white hair-like point; theca oblong, the lid conical, acuminate. *Hook.* Fl. Scot. 2. p. 127. *Musc. Brit.* p. 30. t. 12. *Smith*, E. B. t. 2033.

HAB. 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 ¼d of the length of the theca. *Peristome* much twisted, orange red.

2. T. *ruralis*, stems elongated; leaves oblong, carinate, patent and recurved, the nerve terminating in a long, generally diaphanous, serrate point; theca oblong, the lid subulate; teeth of the peristome united below into a tube. *Hook.* Fl. Scot. 2. p. 127. *Musc. Brit.* p. 31. t. 12. *Smith*, E. B. t. 2070.

HAB. 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* ½–2 inches long, branched. *Setæ* 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.*

3. T. *rigida*, stem scarcely any; leaves patent, oblong or ovate, rigid, their margins much inflexed, the nerve broad; theca oblong, lid conical, acuminate. *Musc. Brit.* p. 30. t. 12. *Smith*, E. B. t. 180.

Hab. Clay-banks, moist rocks, and walls. On a wall by the road-side opposite Parson's Green, Mr D. Steuart.

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.

4. T. *subulata*, stems very short; leaves oblong-lanceolate, acuminate, the nerve excurrent, often forming an apiculus; theca cylindrical, the lid conico-subulate; teeth of the peristome united nearly to the apex into a long tube. *Hook.* Fl. Scot. 2. p. 127. *Musc. Brit.* p. 31. t. 12. *Smith*, E. B. t. 1101.

Hab. Banks and earth-capped walls, very frequent.

Plant an inch high or more, growing in thickish tufts. *Stems* very short, about ¼th of an inch or less. *Leaves* bright green, spreading, entire. *Seta* erect. *Theca* long, slightly curved, reddish. *Lid* ⅓d of the length of the theca. *Peristome* very long, tubular, the teeth free only at the apex.

5. T. *tortuosa*, stems elongated, branched; leaves linear-subulate, carinate, undulate, much twisted when dry; theca cylindrical, the lid rostrate. *Hook.* Fl. Scot. 2. p. 127. *Musc. Brit.* p. 32. t. 12. *Smith*, E. B. t. 1708.

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.

6. T. *fallax*, stems elongated, branched; leaves lanceolate-subulate, patent or recurved, their margins reflexed; theca oblong, the lid rostrate, nearly as long as the theca. *Hook.* Fl. Scot. 2. p. 127. *Musc. Brit.* p. 32. t. 12. *Smith*, E. B. t. 1708, and *T. unguiculata*, t. 2316, and *T. imberbis*, t. 2329.

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.

7. T. *revoluta*, stems short; leaves lanceolate, acuminate, the margins of those of the stem remarkably revolute, the perichætial ones sheathing, their sides involute; theca oblong, the lid rostrate, shorter than the theca. *Hook.* Fl. Scot. 2. p. 127. *Musc. Brit.* p. 33. t. 12. *T. nervosa*, *Smith*, E. B. t. 2383.

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, ¼–½ of an inch high, more or less branched. *Leaves* lanceolate, acute, remarkably revolute, with a strong nerve, and crisped when dry. *Setæ* yellowish, slender, about half an inch high. *Lid* somewhat oblique, subulate, a little shorter than the theca.

8. T. *unguiculata*, stems branched; leaves linear-lanceolate, obtuse, their nerve produced into an apiculus, the margins nearly plane; theca oblong, the lid rostrate, nearly as long as the theca. *Hook.* Fl. Scot. 2. p. 128. *Musc. Brit.* p. 33. t. 12. T. *mucronulata*, *Smith*, E. B. t. 1299. and T. *aristata*, t. 2392. and T. *barbata*, t. 2391. and T. *humilis*, t. 1663. and T. *apiculata*, t. 2494.

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).

1. E. *streptocarpa*, stems elongated; leaves elliptic-lanceolate, somewhat obtuse, their nerve not produced beyond the summit; theca cylindrical, spirally striated; calyptra toothed at the base. *Hook.* Fl. Scot. 2. p. 128. *Musc. Brit.* p. 35. t. 13. *Smith*, E. B. t. 2163.

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.

2. E. *ciliata*, stems somewhat elongate; leaves oblong, acuminate, the nerve produced considerably beyond the summit; theca cylindrical; calyptra toothed at the base. *Hook.* Fl. Scot. 2. p. 128. *Musc. Brit.* p. 35. t. 13. *Smith*, E. B. t. 1418. and *E. alpina*, t. 1419.

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, *rhaptocarpa* I conceive to be really distinct.

3. E. *vulgaris*, stems short; leaves oblong-elliptical, obtuse, their nerve produced a little beyond the summit; theca cylindrical, smooth; calyptra entire at the base. *Hook.* Fl. Scot. 2. p. 128. *Musc. Brit.* p. 35. t. 13. *Smith*, E. B. t. 558.

HAB. Rocks and wall-tops. Extremely abundant on the mud-capped walls by the road-sides, round Edinburgh.

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 scariose or shining as the last, quite entire at the base, and concealing the theca.

22. GRIMMIA.

* *Theca sessile.*

1. G. *apocarpa*, stems branched; leaves ovate-lanceolate, recurvo-patent, their margins reflexed, perichætial ones having their nerve disappearing immediately below their summits; theca shortly ovate, sessile; the lid shortly rostrate. *Hook.* Fl. Scot. 2. p. 128. *Musc. Brit.* p. 36. t. 13. *Smith*, E. B. t. 1134, and G. *rivularis*, t. 1345. and G. *alpicola*, t. 2226. and G. *stricta*, t. 1963.

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 perichætial ones with their nerve running beyond the summit; theca ovate, sessile, the lid shortly rostrate. *Hook.* Fl. Scot. 2. p. 129. *Musc. Brit.* p. 37. t. 13. *Smith*, E. B. t. 1645.

HAB. Crevices of moist marine rocks. Coast of Fife between Pettycur and Kirkcaldy, frequent.

Plant dark dingy brownish-green, growing in very dense tufts. *Stems* half an inch to 1 inch long, branched, thickly clothed with leaves. *Leaves* suberect, crowded, lanceolate, acute, rigid, the perichætial ones longer, with an excurrent nerve. *Theca* subsessile, partly concealed by the leaves.

** *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.

HAB. On stone-walls about Edinburgh. On Arthur's Seat, and coast of Fife, Mr Arnott. Lanark road, about seven miles from Edinburgh, and walls between Colinton and the Pentland Hills, abundant.

Stems tufted, branched, half an inch to 1 inch long or more. *Leaves* lanceolate-subulate, carinate and recurved at the margin, ending in a diaphanous, piliferous point, which varies in length, and giving a more or less hoary appearance to the plant. *Seta* curved and flexuose, not a quarter of an inch long. *Thecæ* numerous, elliptical, or ovate-elliptical, yellowish or reddish-brown, furrowed. *Mouth* contracted; the *lid* rostrate, near half the length of the theca. *Peristome* of 16 equidistant teeth, which are perforated, and sometimes slightly cleft at the apex.

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. *Hook.* Fl. Scot. 2. p. 129. *Musc. Brit.* p. 38. t. 13. *Smith*, E. B. t. 1728.

HAB. On rocks, walls, and stones, excessively common.

Plant forming roundish, very hoary tufts. *Stems* branched, seldom more than half an inch long, thickly clothed with dark green leaves, their strong nerve ending in a long, white, hair-like point. *Seta* always much curved when young, but sometimes erect when old. *Theca* drooping, ovate. *Teeth* of the *peristome* frequently deeply cleft, or perforated.

5. G. *leucophæa*, stem rather short, slightly branched; leaves vate, dark lurid green, with long, white, piliferous points; seta xserted, 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, nerved, 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. *campestris* of Burchell and Hooker, G. *lævigatus* of Bridel, and G. *obtusa* of Schwaegrichen.

6. G. *Doniana*, stems short; leaves lanceolate-subulate, produced into long, diaphanous, hair-like points, their margins incurved; theca ovate, the lid shortly rostrate; teeth of the peristome quite entire. *Hook.* Fl. Scot. 2. p. 129. *Musc. Brit.* p. 40. t. 13. *Smith*, E. B. t. 1259.

HAB. Rocks and stones, rare. Loose stones of the debris above Swanston 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.

1. Pt. *gracile*, branches fascicled, curved; leaves broadly ovate, acute, concave, their margins plane, summits serrate, faintly 2-nerved at the base; lid conical. *Hook.* Fl. Scot. 2. p. 129. *Musc. Brit.* p. 41. t. 14. *Smith*, E. B. t. 1085.

HAB. Rocks and trees. Plentiful about Edinburgh, Sir J. E. Smith. Sparingly in fruit at Braid Hermitage.

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.*

1. W. *lanceolata*, stems somewhat elongated; leaves ovate-lanceolate, with an excurrent nerve, almost piliferous; theca ovate, the lid obliquely rostrate. *Hook.* Fl. Scot. 2. p. 130. *Musc. Brit.* p. 44. t. 14. *Grimmia lanceolata*, *Smith*, E. B. t. 1408.

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

nerve, which terminates at the summit in an apiculus. *Seta* scarcely a quarter of an inch long. *Theca* ovate, the *lid* rostrate.—It resembles in habit the larger plants of *Gymnostomum truncatulum*.

** *Leaves linear or subulate.*

2. W. *curvirostra*, leaves linear-subulate; theca ovate-cylindrical, the lid rostrate. *Hook.* Fl. Scot. 2. p. 130. *Musc. Brit.* p. 44. t. 14. *Grimmia recurvirostra, Smith*, E. B. t. 1438.

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.

Plant having much the habit of a *Tortula*, as Mr Turner long ago observed. *Stem* 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.

3. W. *cirrata*, leaves broadly subulate, crisped when dry, their margins recurved; theca ovate, the lid rostrate. *Hook.* Fl. Scot. 2. p. 130. *Musc. Brit.* p. 46. t. 15. *Grimmia cirrata, Smith*, E. B. t. 2356. and G. *Dicksoni*, t. 1420.

HAB. Posts and rails, old thatched roofs, &c. Braid Hermitage, G. Don. Binny-Craig, Dr Fleming.

Plant 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*. *Setæ* 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.

4. W. *controversa*, stems nearly simple; leaves linear-subulate, crisped when dry, their margins incurved; theca ovate-elliptical, the lid rostrate. *Hook.* Fl. Scot. 2. p. 131. *Musc. Brit.* p. 47. t. 15. *Grimmia controversa, Smith*, E. B. t. 1367.

HAB. Banks in rather dry situations, very common; plentiful in the King's Park.

Plant 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.

5. W. *recurvata*, stems scarcely any; leaves subulate; theca broadly ovate, the lid rostrate; seta curved. *Hook.* Fl. Scot. 2. p. 131. *Musc. Brit.* p. 47. t. 15. *Grimmia recurvata, Smith*, E. B. t. 1489.

HAB. Rocks, chiefly of sandstone. Salisbury Craigs; and at Bilston Burn, G. Don. Bevelaw 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.

6. W. *verticillata*, stems branched; leaves broadly subulate, nearly plane, rather flaccid; theca ovate, the lid rostrate. *Musc. Brit.* p. 48. t. 15. *Grimmia verticillata*, *Smith*, E. B. t. 1258.

HAB. Moist rocks. Auchtertool Linn, Fifeshire.

Plant 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.

7. W. *acuta*, stems branched; leaves subulate-setaceous, subsecund, rigid, canaliculate; theca turbinate, the lid rostrate. *Hook.* Fl. Scot. 2. p. 131. *Musc. Brit.* p. 48. t. 15. *Grimmia acuta*, *Smith*, E. B. t. 1644., and *Dicranum fulvellum*, t. 2268.

HAB. Moist rocks on the mountains. Habbie's How, and elsewhere on the Pentland Hills.

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.* (Fissidens, *Hedw.*)

1. D. *bryoides*, seta terminal; perichætial leaves resembling the cauline ones. *Hook.* Fl. Scot. 2. p. 131. *Musc. Brit.* p. 49. t. 16. *Hypnum bryoides*, *Smith*, E. B. t. 625., and D. *viridulum*, t. 1368., and D. *osmundoides*, t. 1662.

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 lamellæ, which embrace the stem, and often the base of the leaf immediately above. *Seta* 2–4 lines long, red. *Theca* erect, or subcernuous.

2. D. *adiantoides*, seta lateral; perichætial leaves ovate, slightly convolute, pointed. *Hook.* Fl. Scot. 2. p. 131. *Musc. Brit.* p. 51. t. 16. *Hypnum adiantoides*, *Smith*, E. B. t. 264.

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 perichætial leaves, best distinguished by the lateral fruit.

3. D. *taxifolium*, seta arising from the base of the stem; perichætial leaves ovate, sheathing, involute, pointed. *Hook.* Fl. Scot. 2. p. 131. *Musc. Brit.* p. 51. t. 16. *Hypnum taxifolium*, *Smith*, E. B. t. 416.

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 lamellæ, as in the preceding species. *Setæ* 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.*

4. D. *glaucum*, stems branched, fastigiate; leaves erecto-patent, ovate-lanceolate, straight, nerveless, entire; theca ovate, cernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 131. *Musc. Brit.* p. 52. t. 16. *Smith*, E. B. t. 2166.

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.*

5. D. *cerviculatum*, stems short, leaves lanceolate-subulate, entire, subsecund, their nerve very broad; theca ovate, subcernuous, with a struma, the lid rostrate. *Hook.* Fl. Scot. 2. p. 132. *Musc. Brit.* p. 53. t. 16. *Smith*, E. B. t. 1661., and D. *pusillum*, t. 2491., and D. *uncinatum*, t. 2261.

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. *Setæ* 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.

6. D. *flexuosum*, stems nearly simple, rigid; leaves lanceolate-subulate, acuminate, straight, their nerve very broad; theca ovate, striate, the lid rostrate; seta flexuose. *Hook.* Fl. Scot. 2. p. 132. *Musc. Brit.* p. 53. t. 16. *Smith*, E. B. t. 1491.

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 calyptra, 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

oblong, erect, the lid rostrate. *Hook.* Fl. Scot. 2. p. 132. *Musc. Brit.* p. 55. t. 17. *Smith*, E. B. t. 2263.

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.

8. D. *squarrosum*, stems somewhat branched; leaves from a broad sheathing base, lanceolate, obtuse, recurved and patent, directed to every side, crisped when dry; theca ovate, subcernuous, strumose, the lid rostrate. *Hook.* Fl. Scot. 2. p. 133. *Musc. Brit.* p. 55. t. 17. *Smith*, E. B. t. 2004.

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* subcernuous, and furnished with a struma in all my specimens, though placed in another section by Dr Hooker.

9. D. *pellucidum*, stems branched; leaves lanceolate, their margins slightly undulated, serrate, rather obtuse, pointing in all directions; theca ovate, subcernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 133. *Musc. Brit.* p. 55. t. 17. *Smith*, E. B. t. 1346.

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 seta 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.

10. D. *polycarpum*, stems branched; leaves patent, directed to every side, lanceolate-subulate, their margins recurved, flexuose, subserrulate, crisped when dry; theca obovate, subcernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 133. *Musc. Brit.* p. 57. t. 18. *Smith*, E. B. t. 2269, and *D. Bruntoni*, t. 2509.

HAB. Rocks. Arthur's Seat, Mr Arnott. Braid Hill, Mr Rigby. Pentland Hills.

Stems growing in dense roundish tufts, half an inch to 1 inch long, branched. *Leaves* lanceolate, with a long subulate point, bright green, very much crisped 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.

11. D. *undulatum*, stems elongated; leaves nearly plane, lanceolate, attenuate, serrulate at the points, transversely undulate; theca cylindraceous, cernuous, the lid with a long beak. *Hook.* Fl. Scot. 2. p. 133. *Musc. Brit.* p. 57. t. 18. *Smith*, E. B. t. 2260.

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. *Setæ* 1 to near 2 inches long, solitary, or several, when it becomes *D. polysetum* of foreign authors. *Theca* cernuous.

12. D. *scoparium*, stems elongate; leaves narrow, subulate, canaliculate, secund; theca cylindraceous, arched, cernuous, smooth, the lid with a long beak. *Hook.* Fl. Scot. 2. p. 133. *Musc. Brit.* p. 57. t. 18. *Smith*, E. B. t. 354, and *D. majus*, t. 1409.

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. *Setæ* 1–3 from the same perichætium, 1 to near 2 inches long. *Theca* arched, not furrowed when old; the *lid* nearly as long as the theca.

13. D. *fuscescens*, stems elongated, leaves subulate, scarcely subsecund, somewhat crisped when dry; theca cernuous, furrowed, the lid as long as the theca. *Turn.* Musc. Hibern. p. 60. t. 5. f. 1. *Smith*, E. B. t. 1597. *D. scoparium*, β. *Hook.* Fl. Scot. 2. p. 133. *Musc. Brit.* p. 58. t. 18.

HAB. Rocks, banks, and heathy places in mountainous countries. Ravelston Wood, Sir J. E. Smith. Pentland Hills, G. Don. Rosslyn woods.

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.

14. D. *varium*, stems short; leaves narrow, hastato-lanceolate; theca ovate, the lid rostrate. *Musc. Brit.* p. 17.

α. *viride*, leaves pointing in all directions, lanceolate, green; theca subcernuous. *Hook.* Fl. Scot. 2. p. 134. *Musc. Brit.* p. 58. D. *varium*, *Smith*, E. B. t. 1215.

β. *rufescens*, leaves subsecund, lanceolate-subulate, reddish; theca erect. *Hook.* l. c. *Musc. Brit.* l. c. D. *rufescens*, *Smith*, E. B. t. 1216.

HAB. Moist banks, especially on a naked clayey soil. α. in Colinton woods, Maughan. Craiglockhart, and Slateford, &c. β. Braid Hermitage, Sir J. E. Smith. Pentland Hills, G. Don and E. Maughan.

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,

lid with a long beak. *Hook.* Fl. Scot. 2. p. 134. *Musc. Brit.* p. 59. t. 18. *Smith*, E. B. t. 1272.

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-secund, and generally falcate, bright green. *Seta* slender, half an inch long or a little more. *Thecæ* 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.*

1. T. *lanuginosum*, stems elongated, subpinnate; leaves lanceolate-subulate, acuminate; their long diaphanous points serrate, margins recurved; theca ovate, the lid rostrate; seta short. *Hook.* Fl. Scot. 2. p. 134. *Musc. Brit.* p. 60. t. 19. *Smith*, E. B. t. 1348.

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. *Setæ* 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.

2. T. *canescens*, stems elongated, irregularly branched; leaves ovate-lanceolate, their diaphanous acuminated points slightly serrate; theca ovate, the lid subulate; teeth of the peristome very long and filiform. *Hook.* Fl. Scot. 2. p. 134. *Musc. Brit.* p. 61. t. 19. *Smith*, E. B. t. 2534. and T. *ericoides*, t. 1991.

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. *Setæ* 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.

3. T. *heterostichum*, stems elongated, branched; leaves ovate-lanceolate, their diaphanous, acuminated points slightly serrate; theca oblong, the lid rostrate; teeth of the peristome rather short. *Hook.* Fl. Scot. 2. p. 134. *Musc. Brit.* p. 61. t. 19. *Smith*, E. B. t. 1347.

Hab. Rocks and stones on the mountains. Pentland Hills, about Habbie'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. *canescens*, which character, joined to the longer theca, shorter seta, and much shorter lid, will sufficiently distinguish this species.

** *Leaves not diaphanous at their points.*

4. T. *aciculare*, stems elongated, branched; leaves lanceolate, obtuse, serrulate at the points, their nerve vanishing before the summit; theca oblong, with a rostrate lid. *Hook.* Fl. Scot. 2. p. 135. *Musc. Brit.* p. 62. t. 19. *Dicranum aciculare, Smith*, E. B. t. 1978.

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.

5. T. *fasciculare*, stems elongated, branched; leaves lanceolate, entire, their summits not diaphanous, their margins recurved; theca ovate-oblong, with a rostrate lid. *Hook.* Fl. Scot. 2. p. 135. *Musc. Brit.* p. 62. t. 19. *Smith*, E. B. t. 2005.

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.

6. T. *polyphyllum*, stems branched; leaves lanceolate-subulate, their margins recurved, serrate above, very much crisped when dry; theca oblong, with a rostrate lid. *Hook.* Fl. Scot. 2. p. 135. *Musc. Brit.* p. 62. t. 19. *Dicranum polyphyllum, Smith*, E. B. t. 1217.

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. *Thecæ* 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.*

1. D. *purpureum*, stems scarcely branched; leaves lanceolate-acuminate, carinate, their margins recurved, entire; theca ovato-cylindraceous, oblique, substrumose, furrowed when dry, the lid conical. *Hook.* Fl. Scot. 2. p. 135. *Musc. Brit.* p. 65. t. 20. *Dicranum purpureum*, *Smith*, E. B. t. 2262., and *Dic. strictum*, t. 2294. and *Dic. Celsio*, t. 2418., and *Trichostomum papillosum*, t. 2533., and *Bryum bipartitum*, t. 2357.

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.*

2. D. *trifarium*, leaves rather distant, somewhat trifarious, lanceolate, rather obtuse, carinate, with the nerve scarcely reaching to the point; theca oblong-ovate, erect, the lid rostrate. *Hook.* Fl. Scot. 2. p. 136. *Musc. Brit.* p. 67. t. 20. *Trichostomum trifarium*, *Smith*, E. B. t. 1707. and T. *linoides*, t. 2295.

HAB. Moist banks and crevices of rocks. Corstorphine Hill, Mr Arnott. Pentland Hills and coast of Fife. Messrs Arnott and Greville.

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 exserted 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.

3. D. *capillaceum*, stems elongated; leaves nearly distichous, subulate, setaceous; theca erect, ovate-cylindraceous, the lid conical. *Hook.* Fl. Scot. 2. p. 136. *Musc. Brit.* p. 67. t. 20. *Trichostomum capillaceum*, *Smith*, E. B. t. 1152.

HAB. Banks and near rocks on the mountains. Pentland Hills, Sir J. E. Smith.

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.

4. D. *heteromallum*, stems rather short; leaves subsecund, subulate; theca ovate-cylindraceous, the lid conical. *Hook.* Fl. Scot. 2. p. 136. *Musc. Brit.* p. 68. t. 20. *Grimmia heteromalla*, *Smith*, E. B. t. 1899.

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.

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.*

1. P. *undulatum*, leaves lanceolate, undulate, their margins plane, denticulate, their nerve winged; theca cylindrical, curved, the lid subulate. *Hook.* Fl. Scot. 2. p. 125. *Musc. Brit.* p. 24. t. 10. *Smith*, E. B. t. 1220.

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.*

2. P. *piliferum*, leaves lanceolate-subulate, their margins involute, entire, terminating in a pellucid hair-like point; theca ovate, obtusely quadrangular, furnished with an apophysis, the lid conical. *Hook.* Fl. Scot. 2. p. 125. *Musc. Brit.* p. 24. t. 10. *Smith*, E. B. t. 1199.

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.

3. P. *Juniperinum*, leaves lanceolate-subulate, their margins involute, entire, their points acuminate, coloured, subserrate; theca ovate, obtusely quadrangular, furnished with an apophysis, the lid conical. *Hook.* Fl. Scot. 2. p. 126. *Musc. Brit.* p. 25. t. 10. *Smith*, E. B. t. 1200, and *P. strictum*, t. 2435.

HAB. Old turf-capped walls, and on the ground in mountainous places. Mavis Bank, Sir J. E. Smith. Pentland Hills.

Stem 1–2 inches high, mostly simple, often naked at the base, above imbri-

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* 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 *Orthotricum*, *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 membranaceous 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. Grev. 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. *Calyptra* 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 seta.

†† *Leaves serrate, their margins plane.*

4. P. *commune*, stems elongated; leaves patent, linear-subulate, their margins plane, serrate as well as the points of the keel; theca erect, ovate, quadrangular, with an evident apophysis. *Hook.* Fl. Scot. 2. p. 126. *Musc. Brit.* p. 26. t. 10.

α. *yuccæfolium*, 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. 1827.

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. *Calyptra* large, orange, very hairy. *Teeth* of the *peristome* 64.

5. P. *alpinum*, stems elongated, branched; leaves patent, subulate-lanceolate, the margins plane, serrate, as well as the point of the keel; theca sub-ovate with an indistinct apophysis. *Hook.* Fl. Scot. 2. p. 126. *Musc. Brit.* p. 27. t. 11. *Smith*, E. B. t. 1905.

Hab. Banks on the mountains. Pentland Hills, (eastern Cairn Hill), Messrs Somerville and E. Maughan. 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. *Calyptra* 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.

6. P. *urnigerum*, stems elongated, branched; leaves erecto-patent, lanceolate, acute, their margins plane, serrate; theca erect, cylindrical, destitute of an apophysis. *Hook.* Fl. Scot. 2. p. 126. *Musc. Brit.* p. 27. t. 11. *Smith*, E. B. t. 1218.

Hab. Sandy or gravelly banks, in subalpine situations. In the old quarry, Auchindenny 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.

α, *major*, seta 1–2 inches long; stems mostly simple; theca cylindrical. P. *aloides*, *Hook.* Fl. Scot. 2. p. 126. *Musc. Brit.* p. 28. t. 11. *Smith*, E. B. t. 1649., and P. *rubellum*, t. 1939.

β, *nanum*, seta short; theca subglobose. P. *nanum*, *Hedw. Hook.* Fl. Scot. 2. p. 126. *Musc. Brit.* p. 28. t. 11. *Smith*, E. B. t. 1625., and P. *subrotundum*, t. 1624.

γ, *Dicksoni*, setæ very short; stems short, branched with innovations. P. *Dicksoni*, *Smith*, E. B. t. 1605.

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.

1. F. *hygrometrica*, leaves very concave, ovate, apiculate, entire, the nerve excurrent; seta curved, flexuose. *Hook.* Fl. Scot. 2. p. 136. *Musc. Brit.* p. 69. t. 20. *Smith*, E. B. t. 342.

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 scariose 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.*

1. O. *anomalum*, leaves lanceolate, erecto-patent; seta exserted; peristome of 8 double teeth; calyptra slightly pilose. *Hook.* Fl. Scot. 2. p. 137. *Musc. Brit.* p. 72. t. 21. (Not of E. B. or Fl. Brit.)

HAB. Rocks and stones, frequent. King's Park.

Stems rather broadly tufted, branched, scarcely an inch long. *Leaves* lanceolate, erect, imbricated, the margins revolute, dark brownish-green. *Seta* short, but always exserted, that is, longer than the leaves. *Calyptra* slightly hairy. *Peristome* of 8 double teeth, suberect, but never recurved when dry; arched over the mouth when moist.

2. O. *cupulatum*, leaves lanceolate, erecto-patent; theca subsessile; peristome of 16 double teeth; calyptra slightly pilose. *Hook.* Fl. Scot. 2. p. 137. *Musc. Brit.* p. 72. t. 21. O. *anomalum*, *Smith*, E. B. t. 1423, and O. *nudum*, t. 1325.

HAB. On trees and stones. Near Edinburgh, Sir J. E. Smith. I have also gathered it, but forget the stations.

Stems tufted, rather robust, an inch long, branched. *Leaves* dark green, quite erect when dry, somewhat revolute at the margin. *Theca* half buried among the leaves. *Calyptra* more or less pilose, mostly slightly so. *Peristome* lying flat over the mouth; each tooth marked by a longitudinal line, jointed and diaphanous.

** *Peristome with* 8 *ciliary processes.*

3. O. *crispum*, leaves lanceolate-subulate, much crisped when dry; seta much exserted; theca striate; peristome with 8 ciliary processes; calyptra very pilose. *Hook.* Fl. Scot. 2. p. 137. *Musc. Brit.* p. 73. t. 21. *Smith*, E. B. t. 996.

HAB. On trees (rarely stones). Frequent on bushes in heathy or subalpine 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.

4. O. *affine*, leaves recurvo-patent, flaccid, broadly lanceolate; theca sessile, deeply sulcate; peristome of 8 geminate teeth and 8 ciliary processes; calyptra subpilose. *Hook.* and *Tayl.* Musc. Brit. ed. 2. MSS.; ed. 1. p. 74. t. 21. Fl. Scot. 2. p. 137.

α, *majus*, stems very short; calyptra, especially above, pilose. O. *affine*, *Smith*, E. B. t. 1323.

β, *pumilum*, stems very short; calyptra glabrous. O. *pumilum*, *Smith*, E. B. t. 2168.

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 ciliæ, 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 subsessile, slightly striate towards the mouth;

peristome of 16 distinct teeth and 8 ciliary processes; calyptra very hairy. *Funck*, Deutschlands Moose, p. 35. *Hook.* and *Tayl.* Musc. Brit. ed. 2. MSS.

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 destitute of furrow" (except towards the mouth, and in age). "The peristome 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 suddenly 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. *rupincola* is vastly browner than that of O. *affine*; and in this respect, and in rigidity, coming nearer to O. *Hutchinsiæ*."

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. *rupestre*. The ciliary processes, under a high power, are divided by a longitudinal 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 ciliary processes; calyptra subpilose. *Hook.* Fl. Scot. 2. p. 137. *Musc. Brit.* p. 74. t. 21. *Smith*, E. B. t. 1324.

HAB. Trees 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-lanceolate, crisped when dry; seta exserted; peristome with 16 slender ciliary processes; calyptra subpilose, plicate at the base. *Hook.* Fl. Scot. 2. p. 137. *Musc. Brit.* p. 75. t. 21. *Smith*, E. B. t. 1784.

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. Drumshoreland 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 ciliæ. *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.

7. O. *striatum*, stems elongate, branched; leaves lanceolate-patent, slightly twisted when dry; theca sessile, ovate, smooth; peristome with 16 torulose ciliary processes; calyptra subpilose. *Hook.* Fl. Scot. 2. p. 137. *Musc. Brit.* p. 76. t. 21. *Smith*, E. B. t. 2187.

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; *Ciliæ* 16, irregularly moniliform.

9. O. *Lyellii*, stems elongate, much branched; leaves long, linear-lanceolate, recurvo-patent, crisped when dry; theca oblong, striate; peristome with 16, rather broad, distinctly jointed ciliary processes; calyptra hairy. *Hook.* Fl. Scot. 2. p. 137. *Musc. Brit.* p. 76. t. 22.

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* of 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.

1. A. *curtipendulum*, leaves ovate, acuminate, serrulate, the nerve disappearing below the point; seta twice as long as the perichætium; theca ovate. *Hook.* Fl. Scot. 2. p. 138. *Musc. Brit.* p. 79. t. 22. *Neckera curtipendula*, *Smith*, E. B. t. 1444.

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.

2. A. *viticulosum*, leaves ovate-lanceolate, obtuse, entire, the nerve reaching to the point; seta very long; theca cylindrical. *Hook.* Fl. Scot. 2. p. 138. *Musc. Brit.* p. 80. t. 22. *Hypnum viticulosum*, *Smith*, E. B. t. 265.

HAB. Rocks, and sometimes trees. Craigmillar Castle, Mr E. Maughan. Craiglockhart. Always barren at both stations.

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-

dulate, sometimes secund at the extremities of the branches; colour dark but rather bright green, turning yellow in age. *Seta* 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.

1. N. *crispa*, leaves oblong, acuminulate, transversely rugose; seta much exserted; theca ovate. *Hook.* Fl. Scot. 2. p. 138. *Musc. Brit.* p. 78. t. 22. *Hypnum crispum*, *Smith*, E. B. t. 617.

HAB. Rocks. Habbie's How, in the Pentland Hills, Mr E. Maughan. Rosslyn woods.

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.)

1. F. *antipyretica*, leaves nerveless, acutely carinate. *Hook.* Fl. Scot. 2. p. 138. *Musc. Brit.* p. 82. t. 22. *Smith*, E. B. t. 859.

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 perichætium.

2. F. *squamosa*, leaves nerveless, plane, or very slightly concave, shining. *Hook.* Fl. Scot. 2. p. 139. *Musc. Brit.* p. 82. t. 22. *Smith*, E. B. t. 1861.

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. *aphylla*.

Hook. Fl. Scot. 2. p. 139.; and Fl. Lond. New Series. *Musc. Brit.* p. 84. t. 22. *Smith*, E. B. t. 1596.

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.*

1. B. *pomiformis*, leaves patent, subulate, strongly serrate, the nerve reaching to the summit, twisted when dry. *Hook.* Fl. Scot. 2. p. 139. *Musc. Brit.* p. 85. t. 23.

α, *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 α 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 to near the apex. *Seta* an inch long, erect. *Theca* globose, becoming striate when old. *Lid* convexo-mamillate.

2. B. *fontana*, stems fastigiate; leaves closely imbricated, rigid, erect, broadly ovate or lanceolate, acuminate, nearly plane, serrate; seta lateral from innovations. *Hook.* Fl. Scot. 2. p. 140. *Musc. Brit.* p. 87. t. 23.

α, *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. α, 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.*

3. B. *arcuata*, stems much elongated, proliferous; leaves horizontally patent, ovate-lanceolate, acuminate, serrate, striate; seta very short, arcuate, at length lateral; theca smooth. *Hook.* Fl. Scot. 2. p. 140. *Musc. Brit.* p. 88. t. 23. *Smith*, E. B. t. 1237.

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.

1. H. *lucens*, leaves broadly ovate, entire, obtuse, nerveless. *Hook.* Fl. Scot. 2. p. 141. *Musc. Brit.* p. 89. t. 27. *Smith*, E. B. t. 1902.

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. *Calyptra* very pale.—A beautiful moss.

47. HYPNUM.

DIV. I. *Stems (taken in conjunction with the leaves) plane.*

* *Theca erect.*

1. H. *trichomanoides*, leaves broadly scymitar-shaped, serrate at the point, the nerve reaching to the middle of the leaf; theca ovate, erect, the lid rostrate. *Hook.* Fl. Scot. 2. p. 141. *Musc. Brit.* p. 91. t. 24. *Smith*, E. B. t. 1493.

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.

2. H. *complanatum*, leaves oblong, apiculate, entire, nerveless; theca ovate, erect, the lid rostrate. *Hook* Fl. Scot. 2. p. 141. *Musc. Brit.* p. 91. t. 24. *Smith*, E. B. t. 1492.

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 perichætium. *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.

HAB. 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 lanceolato-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 shortly conical lid.

4. H. *undulatum*, leaves ovate, acute, transversely undulate, with 2 faint nerves at the base; theca oblong, furrowed, arcuato-cernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 141. *Musc. Brit.* p. 92. t. 24. *Smith*, E. B. t. 1181.

HAB. 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.

5. H. *denticulatum*, leaves ovate, sometimes approaching to lanceolate, more or less acuminate, having 2 short nerves at the base; theca oblong-cylindraceous, inclined, the lid conical. *Hook.* Fl. Scot. 2. p. 141. *Musc. Brit.* p. 92. t. 24. *Smith*, E. B. t. 1260, and H. *Donianum*, t. 1446.

HAB. 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 shortly 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,

entire, their nerve reaching to the summit; theca ovate, cernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 142. *Musc. Brit.* p. 93. t. 24. *Smith*, E. B. t. 1859.

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.

7. H. *serpens*, leaves ovate-lanceolate, rather obtuse, patent, entire, their nerve for the most part reaching to the summit; theca cylindrical, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 142. *Musc. Brit.* p. 94. t. 24. *Smith*, E. B. t. 1037, and *H. subtile*, t. 2496.

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* arched and cernuous. *Lid* conical, short.—A delicate, very slender moss.

8. H. *populeum*, leaves lanceolate, acuminate, serrate, margin slightly reflexed, nerve reaching to the point; theca ovate, nearly erect; the lid conical; seta rough. *Hook.* Fl. Scot. 2. p. 142. *Musc. Brit.* p. 94. t. 24. *H. implexum*, *Smith*, E. B. t. 1584.

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.*

9. H. *Schreberi*, leaves closely imbricated, nearly erect, elliptical, apiculate, concave, entire, faintly 2-nerved at the base; theca ovate, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 143. *Musc. Brit.* p. 96. t. 24. *Smith*, E. B. t. 1621.

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

short point, very concave, their nerve reaching half way up; theca ovate, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 143. *Musc. Brit.* p. 98. t. 24. *Smith*, E. B. t. 1599, and *H. illecebrum*, E. B. t. 2189, (not of Hedwig).

HAB. Woods and banks, very common, but less so in fruit.

Stems 3–10 inches long, branched, pinnate; branches rather tumid. *Leaves* very concave, suddenly apiculate, imbricated, shining. *Seta* an inch and a half long. *Theca* ovate, cernuous, dark brown. *Lid* conical, very shortly beaked.

** *Leaves entire; lanceolate or subulate.*

11. H. *plumosum*, leaves erecto-patent, the uppermost ones mostly secund, all ovato-lanceolate, acuminate, subserrate, the nerve reaching above half way; theca ovate, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 143. *Musc. Brit.* p. 98. t. 25. *Smith*, E. B. t. 2071, and *H. alpinum*, t. 1496.

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.

12. H. *pulchellum*, leaves loosely imbricated, the upper ones subsecund, all lanceolate-acuminate, entire, nerveless; theca ovate-cylindrical, nearly erect, the lid conical. *Hook.* Fl. Scot. 2. p. 143. *Musc. Brit.* p. 99. t. 25. *Smith*, E. B. t. 2006.

HAB. Moist banks among rocks, rather rare. Habbie's How, in the Pentland Hills, Mr Arnott. Auchindenny woods.

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.

13. H. *sericeum*, leaves erecto-patent, lanceolate, acuminate, entire, striate, nerve running to three-fourths of the length; theca ovate-cylindrical, erect, the lid conical. *Hook.* Fl. Scot. 2. p. 143. *Musc. Brit.* p. 100. t. 25. *Smith*, E. B. t. 1445.

HAB. Rocks, wall-tops, trees, very abundant.

Plant very silky in appearance, bright yellowish-green, 2–4 inches long, creeping in a dense manner on walls and trunks of trees, and throwing up a quantity of short, erect, crowded, mostly simple branches. *Leaves* closely imbricated, erect, entire, striate. *Seta* erect, scarcely an inch long. *Theca* erect, ovate-cylindrical, deep, red brown. *Lid* conical.

14. H. *rufescens*, leaves erecto-patent, lanceolate, acuminate,

entire, striate, faintly 2-nerved at the base; theca ovate, nearly erect, the lid conical. *Hook.* Fl. Scot. 2. p. 143. *Musc. Brit.* p. 99. t. 25. *Smith*, E. B. t. 2296.

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-acuminate, 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 cernuous *theca*. *Lid* conical, with a short beak.

16. H. *nitens*, leaves erecto-patent, narrow, lanceolate, acuminate, nearly entire, striate, nerve running nearly to the summit; theca oblong-ovate, curved, cernuous, the lid conical; seta smooth. *Hook.* Fl. Scot. 2. p. 144. *Musc. Brit.* p. 100. t. 25. *Smith*, E. B. t. 1646.

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*.

17. H. *albicans*, leaves erecto-patent, ovate-lanceolate, acuminate, striate, entire, nerve reaching half way up; theca ovate, cernuous, the lid conical; seta smooth. *Hook.* Fl. Scot. 2. p. 144. *Musc. Brit.* p. 101. t. 25. *Smith*, E. B. t. 1300.

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.*

18. H. *alopecurum*, stems mostly erect, below simple and naked, fascicled above; leaves concave, ovate, elliptical, acute, serrate, nerve running nearly to the point, margin reflexed; theca ovate, cernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 144. *Musc. Brit.* p. 101. t. 25. *Smith*, E. B. t. 1182.

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.

19. H. *dendroides*, stems erect, below simple and naked, fascicled above; leaves ovate, often more or less lanceolate, striate, serrate at the point, nerve reaching nearly to the summit; theca erect, ovate-cylindrical, the lid rostrate. *Hook.* Fl. Scot. 2. p. 144. *Musc. Brit.* p. 101. t. 25. *Smith*, E. B. t. 1565.

HAB. Woods, bogs, moist pastures, &c. frequent. In fruit on the Pentland Hills. Banks above the sea west from Pettycur; 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. *Setæ* 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.*

20. H. *curvatum*, branches fascicled, curved; leaves ovate-elliptical, concave, serrate at the points, nerve disappearing beyond the middle; theca ovate, erect, the lid rostrate. *Hook.* Fl. Scot. 2. p. 144. *Musc. Brit.* p. 102. t. 25. *Smith*, E. B. t. 1566.

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.

21. H. *myosuroides*, branches fascicled, curved; leaves lanceolate-acuminate, serrate, margins reflexed at the base, their nerve disappearing near the middle; theca ovate-cylindrical, erect, the lid rostrate. *Hook.* Fl. Scot. 2. p. 144. *Musc. Brit.* p. 102. t. 25. *Smith*, E. B. t. 1567.

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.*

22. H. *splendens*, stems tripinnate; leaves ovate, with a suddenly acuminate, serrate point, concave, faintly 2-nerved at the base, margin recurved below; theca ovate, the lid rostrate. *Hook.* Fl. Scot. 2. p. 144. *Musc. Brit.* p. 103. t. 25. *Smith*, E. B. t. 1424.

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.

23. H. *proliferum*, stems tripinnate; leaves serrate, papillose on the back, the cauline ones cordate-acuminate, striate, with a nerve running nearly to the point, those of the branches more ovate, with a single or double nerve at the base. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 103. t. 25. *Smith*, E. B. t. 1494, and *H. recognitum*, t. 1495.

HAB. Woods and banks, frequent. In fruit at Auchindenny, and elsewhere.

Plant of a dull opake green, not in the least shining. *Stems* 3–8 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.

24. H. *prælongum*, stems sub-bipinnate; leaves distantly placed, patent, cordate or ovate, acuminate, serrate, nerve disappearing below the summit; theca ovate, cernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 103. t. 25. *Smith*, E. B. t. 2035, and *H. Stokesii*, t. 2036, and *H. Swartzii*, t. 2034.

HAB. Woods, on the ground and trunks of trees, very frequent.

Stems sometimes loosely tufted, but more or less straggling in its mode of growth, 2–8 inches long, branched, more or less pinnate 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 subpinnate.*)

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 minute point. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 105. t. 25. *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 acuminated 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 rostrate by the authors of *Muscologia Britannica*.

26. H. *rutabulum*, stems variously branched; leaves patent, ovate, acuminate, serrate at the point, striate, their nerve reaching half way; theca ovate, cernuous, the lid conical; seta rough. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 105. t. 26. *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, somewhat striate. *Seta* about an inch long, dark red, rough with minute tubercles. *Theca* ovate, dark red. *Lid* conical, acute.

27. H. *velutinum*, stems variously branched; leaves erecto-patent, ovate, often approaching to lanceolate, acuminate, serrate, striate, nerve reaching half-way; theca ovate, cernuous, the lid conical; seta rough. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 105. t. 26. *Smith*, E. B. t. 1568, and *H. intricatum*, 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-lanceolate, 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 loosely imbricated, subpatent, broadly ovate, acute, serrate, concave, their nerve reaching nearly to the summit; theca ovate, cernuous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 106. t. 26. *Smith*, E. B. t. 1275.

HAB. Stones and wood in streams, especially subalpine rivulets. Pentland Hills, in great abundance. Water of Leith, &c.

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.

29. H. *striatum*, stems variously branched; leaves patent, cordate-acuminate, serrate, striate, nerve reaching beyond the middle; theca oblong-ovate, cernuous, the lid rostrate; seta smooth. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 106. t. 26. *Smith*, E. B. t. 1648.

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.

30. H. *confertum*, stems variously branched; leaves erecto-patent, ovate, acuminate, concave, serrate, their nerve reaching half way; theca ovate, cernuous, the lid rostrate; seta smooth. *Hook.* Fl. Scot. 2. p. 145. *Musc. Brit.* p. 106. t. 26. *Smith*, E. B. t. 2407, and *H. serrulatum*, t. 1262.

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.*

31. H. *cuspidatum*, leaves loosely set, ovate, concave, nerveless, entire, the lower ones squarrose, those of the summit closely imbricated into a cuspidate point; theca oblong, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 146. *Musc. Brit.* p. 107. t. 26. *Smith*, E. B. t. 2407.

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.

32. H. *cordifolium*, leaves loosely set, squarrose, cordate-ovate, obtuse, concave, entire, their nerve running very nearly to the point; theca oblong, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 146. *Musc. Brit.* p. 107. t. 26. *Smith*, E. B. t. 1447.

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

reddish or yellowish. *Seta* above 2 inches long. *Theca* shortly ovate. *Lid* conical, with a very short obtuse beak.

33. H. *stellatum*, leaves loosely set, squarrose, cordate, much acuminate, entire, nerveless; theca oblong-ovate, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 146. *Musc. Brit.* p. 108. t. 26.

α. *majus*, stems larger, lax; leaves fine shining yellow-brown. *H. stellatum*, *Smith*, E. B. t. 1302.

β. *minus*, stems smaller, more branched and entangled; leaves greener and more recurved. *H. squarrosulum*, *Smith*, E. B. t. 1709.

HAB. α. in wet places and sides of rivulets on the hills. β. on rocks and wall-tops. α. on the Pentland Hills, not unfrequently. β. 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 α, and shining, yellowish-green in β. *Seta* above an inch long. *Theca* cernuous. *Lid* conical, with a short point.—Var. β. is rare in fruit.

34. H. *loreum*, leaves recurved, squarrose, lanceolate, much acuminate, concave, serrate, striate, faintly 2-nerved at the base; theca globose-ovate, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 146. *Musc. Brit.* p. 108. t. 26. *Smith*, E. B. t. 2072.

HAB. Woods and heaths. Ravelston Wood, Sir J. E. Smith. Pentland Hills in great abundance, and elsewhere about Edinburgh.

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.

35. H. *triquetrum*, leaves squarrose, cordate-acuminate, serrate, faintly striated, with two nerves at the base; theca globose-ovate, the lid conical. *Hook.* Fl. Scot. 2. p. 146. *Musc. Brit.* p. 108. exclud. var. β. *Smith*, E. B. t. 1622.

HAB. Woods and banks, very common. In fruit at Auchindenny woods, abundantly.

Stems robust, much branched, 6–12 inches long, branches spreading. *Leaves* pale yellowish green, shining, striate, very squarrose. *Seta* an inch long, deep red. *Theca* deep red, roundish ovate. *Lid* conical.

36. H. *squarrosum*, leaves squarrose, widely cordate, very much acuminate, and recurved, serrate, faintly 2-nerved at the base; theca ovato-globose, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 146. *Musc. Brit.* p. 109. t. 26. *Smith*, E. B. t. 1953.

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.*

37. H. *palustre*, leaves secund, ovate, somewhat acuminate, concave, entire, margins incurved above; nerve short, often forked, sometimes obsolete; theca oblong-ovate, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 147. *Musc. Brit.* p. 110. t. 26. *Smith*, E. B. t. 1665. and H. *fluviatile*, t. 1303. and H. *adnatum*, t. 2406. (Neither of the last are Hedwig's species of the same name.)

HAB. Banks of streams, stones in rivulets, wet rocks, &c. abundant. Bilston Burn, G. Don. Colinton; Slateford; 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.

38. H. *filicinum*, stems subpinnate; leaves, especially the upper ones, falcato-secund, broadly ovate, acuminate, serrate, their nerve reaching to the point; theca oblong-ovate, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 147. *Musc. Brit.* p. 109. t. 26. *Smith*, E. B. t. 1570. and H. *dubium*, t. 2126. and H. *fallax*, t. 2127.

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.

39. H. *aduncum*, leaves falcato-secund, lanceolate-subulate, concave, or almost semicylindrical, entire, the nerve disappearing below the summit; theca oblong-ovate, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 147. *Musc. Brit.* p. 111. t. 26.

α. *revolvens*, leaves narrow, very much falcate. H. *revolvens*, *Smith*, E. B. t. 2073.

β. *rugosum*, leaves wider, less falcate, somewhat rugose. H. *rugosum*, *Smith*, E. B. t. 2250.

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

points, the nerve reaching more than half way; theca ovate-oblong, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 147. *Musc. Brit.* p. 98. t. 24. *Smith*, E. B. t. 1448.

HAB. Pools and slow streams; wet bogs. Pentland Hills, not frequent, and never in fructification.

Stems varying from 2 to 18 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.

41. H. *uncinatum*, leaves falcato-secund, lanceolate-subulate, serrate, striate, nerve disappearing below the point; theca cylindrical, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 147. *Musc. Brit.* p. 111. t. 26. *Smith*, E. B. t. 1600.

HAB. Moist banks and stones, especially in a red clayey soil and subalpine countries. Slateford; King's Park; Pentland Hills.

Stems 2–3 inches long, branched, pinnate, decumbent, growing in thick patches. *Leaves* yellow green, shining, striate, much and elegantly falcate. *Seta* an inch long. *Theca* red, curved, cylindrical. *Lid* conical, with a small acute point.

42. H. *commutatum*, stems pinnate; leaves falcato-secund, cordate, very much acuminate, serrate, their margins reflexed, nerve disappearing below the summit; theca oblong-ovate, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 148. *Musc. Brit.* p. 112. t. 27. *Smith*, E. B. t. 1567.

HAB. Wet mossy rocks and margins of rivulets. About St Bernard's Well. Habbie's How and many other places in the 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. *filicinum*. *Seta* an inch and a half long. *Lid* conical, with a very short acute point.—A much larger and greener plant than H. *filicinum*.

** *Leaves without a nerve, or with two very indistinct ones at the base.*

43. H. *scorpioides*, leaves secund, broadly ovate, ventricose, obtuse, entire, nerveless; theca oblong-ovate, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 148. *Musc. Brit.* p. 112. t. 27. *Smith*, E. B. t. 1039.

HAB. Wet bogs. Pentland Hills near Currie, and at Ravelrig-toll-moss, a few yards west of the *Salicetum*, but never in fruit.

Stems erect, in dense masses, 3–12 inches long, branched, robust. *Leaves* large, nerveless and obtuse, dark reddish brown, or purplish at the summits of the stems, sometimes green. *Seta* 2 inches long. *Theca* curved. *Lid* shortly conical.—One of the largest British Hypna.

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;

theca cylindrical, erecto-cernuous, the lid conical with a point. *Hook.* Fl. Scot. 2. p. 148. *Musc. Brit.* p. 113. t. 27.

α. *vulgaris*, stems broad, semicylindrical; leaves falcato-secund. H. *cupressiforme*, *Smith*, E. B. t. 1860. and H. *nigro-viride*, t. 1620.

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. *polyanthos*, *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 pinnate, 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.

45. H. *Crista-castrensis*, stems closely pectinate; leaves falcato-secund, ovate-lanceolate, acuminate, serrulate, striate, faintly 2-nerved at the base; theca oblong-ovate, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 148. *Musc. Brit.* p. 114. t. 27. *Smith*, E. B. t. 2108.

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, 3–8 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.

46. H. *molluscum*, stems pectinate; leaves falcato-secund, cordate, much acuminate, serrate, not striate, faintly 2-nerved at the base; theca oblong-ovate, curved, cernuous, the lid conical. *Hook.* Fl. Scot. 2. p. 148. *Musc. Brit.* p. 114. t. 27. *Smith*, E. B. t. 1327.

HAB. On the ground and on rocks, frequent. Slateford; Braid Hermitage; 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 striæ. *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

lid conical. *Hook.* Fl. Scot. 2. p. 149. *Musc. Brit.* p. 115. t. 28. *Smith*, E. B. t. 391.

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.)

2. B. *dealbatum*, stems short; leaves lanceolate, acute, plane, serrate at the points, reticulated; theca pyriform, nearly erect. *Hook.* Fl. Scot. 2. p. 149. *Musc. Brit.* p. 117. t. 28. *Smith*, E. B. t. 1571.

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.)

3. B. *pyriforme*, stems slightly branched; leaves subulate-setaceous, flexuose, serrate, nerve very broad; theca pyriform, pendulous. *Hook.* Fl. Scot. 2. p. 149. *Musc. Brit.* p. 118. t. 28. B. *aureum*, *Smith*, E. B. t. 389.

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.*

4. B. *crudum*, stems simple; leaves rigid lanceolate, the upper ones the narrowest and longest, all plane, serrulate, nerve disappearing below the summit; theca oblong-subpyriform, cernuous. *Hook.* Fl. Scot. 2. p. 150. *Musc. Brit.* p. 119. t. 28. *Smith*, E. B. t. 1604.

Hab. Moist banks and crevices of rocks, not frequent. Pentland Hills, Mr Arnott. Craiglockart.

Stems 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.

5. B. *carneum*, stems simple; leaves lanceolate, reticulated, slightly serrulate at the point, nerve disappearing below the summit; theca obovate, pendulous. *Hook.* Fl. Scot. 2. p. 150. *Musc. Brit.* p. 119. t. 29. *Smith*, E. B. t. 360.

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.

6. B. *argenteum*, stems branched; leaves closely imbricated, broadly ovate, suddenly and sharply acuminate, subserrulate, very concave, nerve disappearing below the point; theca ovate-pyriform, pendulous. *Hook.* Fl. Scot. 2. p. 150. *Musc. Brit.* p. 120. t. 29. *Smith*, E. B. t. 1602.

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. *Zierii*, stems branched; leaves closely imbricated, more or less broadly ovate, acuminulate, 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.*

8. B. *roseum*, leaves obovate-spathulate, acute, serrate, undulate, nerve running to the point; theca oblong-ovate, pendulous. *Hook.* Fl. Scot. 2. p. 150. *Musc. Brit.* p. 120. t. 29. *Smith*, E. B. t. 2395.

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. *Setæ* 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

margins slightly thickened; theca oblong pendulous. *Hook.* Fl. Scot. 2. p. 150. *Musc. Brit.* p. 121. t. 29. *Smith,* E. B. t. 2007.

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. *cæspititium*, 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.

α. *major*, B. *cæspiticium*, *Smith*, E. B. t. 1904.

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.

11. B. *turbinatum*, stems branched with innovations; leaves ovate, acuminate, nearly entire, the margins slightly recurved, the nerve running beyond the points; theca elongato-pyriform, pendulous. *Hook.* Fl. Scot. 2. p. 151. *Musc. Brit.* p. 122. t. 29. *Smith*, E. B. t. 1572. and B. *nigricans*, t. 1528.

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.

12. B. *nutans*, stems mostly short; leaves erect, lanceolate, acuminate, serrate above, nerve reaching to the point; theca oblong-pyriform, pendulous. *Hook.* Fl. Scot. 2. p. 151. *Musc. Brit.* p. 123. t. 29. *Smith*, E. B. t. 1240. and B. *compactum*, t. 1527. (According to specimens from G. Don.)

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.

13. B. *ventricosum*, stems elongated, branched with innovations; leaves oblong, acuminate, scarcely serrulate, margins recurved, nerve reaching beyond the point; theca oblong-obovate, pendulous. *Hook.* Fl. Scot. 2. p. 151. *Musc. Brit.* p. 124.

t. 30. *Smith*, E. B. t. 2270. and B. *bimum*, t. 1518. and B. *cubitale*, t. 2554.

HAB. Bogs and crevices of wet rocks. Pentland Hills, Maughan. Mavis Bank, Sir J. E. Smith.

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.*

14. B. *punctatum*, stem elongated; leaves obovate-rotundate, very obtuse, reticulated, their margins thickened, entire, nerve disappearing below the point; theca ovate, pendulous, the lid shortly rostrate. *Hook.* Fl. Scot. 2. p. 151. *Musc. Brit.* p. 125 t. 30. *Smith*, E. B. t. 1183.

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.*

15. B. *ligulatum*, stems elongated; leaves undulate, ligulate, reticulated, their margins thickened, denticulate, nerve reaching a little beyond the point; theca ovate, pendulous, the lid conical. *Hook.* Fl. Scot. 2. p. 151. *Musc. Brit.* p. 126. t. 30. *Smith*, E. B. t. 1449.

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. *Setæ* 1–6 or more, an inch long.

16. B. *rostratum*, stems elongated; leaves broadly ovate, reticulated, their margins thickened, obtuse, denticulated, the nerve reaching a little beyond the point; theca ovate, pendulous, the lid rostrate. *Hook.* Fl. Scot. 2. p. 151. *Musc. Brit.* p. 126. t. 30. *Smith*, E. B. t. 1475.

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. *Setæ* 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

little beyond the point; theca ovate, pendulous, the lid shortly rostrate. *Hook.* Fl. Scot. 2. p. 152. *Musc. Brit.* p. 126. t. 31. *Smith*, E. B. t. 1493.

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.

18. B. *hornum*, stems elongated; leaves lanceolate, acute, reticulated, their margins thickened, denticulate, nerve generally disappearing below the summit; theca oblong-ovate, pendulous, the lid hemispherical, mucronulate. *Hook.* Fl. Scot. 2. p. 152. *Musc. Brit.* p. 127. t. 31. *Smith*, E. B. t. 2271.

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.

19. B. *cuspidatum*, stems elongated; leaves obovate, acute, reticulated, their margins thickened, denticulate above, nerve running beyond the point; theca ovate, pendulous, the lid conico-hemispherical, obtuse. *Hook.* Fl. Scot. 2. p. 152. *Musc. Brit.* p. 127. t. 31. *Smith*, E. B. t. 1474.

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.

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.

HAB. Moist rocks and bogs. Pentland Hills. Bogs at Glassmont.

Fronds either spreading horizontally and lax, or very crowded, and growing upright in dense tufts, 1–3 inches in length, and variously branched;

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* The characters of this genus are chiefly taken from the excellent Monograph of the British species, published by Dr Hooker.

substance opake, 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.

2. J. *multifida*, frond linear, fleshy, compressed, branched in a pinnatifid manner; fruit marginal; calyx very short, the mouth dilated, fimbriate. *Hook.* Fl. Scot. 2. p. 118. *Jung.* t. 45. *Smith*, E. B. t. 186., and J. *sinuata*, t. 1476.

HAB. Bogs 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 pinnæ 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.*

3. J. *Blasia*, frond oblong, submembranaceous, dichotomous, costate, having scattered scales on the under side; calyx and the calyptra within the frond. *Hook.* Fl. Scot. 2. p. 118. *Jung.* t. 82–84. *Blasia pusilla*, *Smith*, E. B. t. 1328.

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 *Jungermanniæ*, 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 subcylindrical 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 radicating 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.

5. J. *furcata*, frond linear, dichotomous, membranaceous; upper surface glabrous; theca arising from the lower surface of the nerve. *Hook.* Fl. Scot. 2. p. 118. *Jung.* t. 50. and 51. *Smith*, E. B. t. 1632., and J. *fruticulosa*, t. 2514.

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."

6. J. *pubescens*, frond linear, dichotomous, membranaceous, every where pubescent. *Hook.* Fl. Scot. 2. p. 119. *Jung.* t. 73.

HAB. Trees and shady rocks, especially in subalpine situations. Rosslyn and Auchindenny woods, &c.

Fronds 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.*

A. *Leaves inserted on all sides of the stem.*

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.*

8. J. *asplenoides*, stem ascending, branched, leaves obovate-roundish, ciliato-dentate, subrecurved; fruit terminal and lateral; calyx oblong, compressed, oblique, the mouth truncate, subciliate. *Hook.* Fl. Scot. 2. p. 113. *Jung.* t. 13. *Smith*, E. B. t. 1788.

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.

9. J. *pumila*, stem ascending, nearly simple; leaves elliptical-ovate; fruit terminal; calyx oblong-ovate, acuminate, the mouth contracted, denticulate. *Hook.* Fl. Scot. 2. p. 112. *Jung.* t. 17. *Smith*, E. B. t. 2230.

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.

11. J. *crenulata*, stem procumbent, branched; leaves orbicular, margined; fruit terminal; calyx obovate, compressed, longitudinally quadrangular, the mouth contracted, toothed. *Hook.* Fl. Scot. 2. p. 112. *Jung.* t. 37. *Smith*, E. B. t. 2238.

β. *gracillima*, stems slender; leaves distant, minute. *J. gracillima*, E. B. t. 2238.

HAB. Bogs and moist woods. About Edinburgh, Mr Shuter. Auchindenny woods.

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.

14. J. *connivens*, stem procumbent, branched in a stellated manner; leaves orbicular, concave at the extremity, lanceolate-emarginate; fruit terminal upon short central branches; calyx oblong-ovate, the mouth ciliate. *Hook.* Fl. Scot. 2. p. 113. *Jung.* t. 15. *Smith*, E. B. t. 2436.

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 radicular fibres; nearly an inch long. *Leaves* very pale green, alternate, in two rows, bifid, the segments incurved. *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.

HAB. Moist rocks, woods, &c. Rosslyn and Auchindenny woods. Pentland Hills.

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-

equally 2-lobed, waved, entire, lobes roundish, conduplicate, lower ones the largest; fruit terminal; calyx oblong, incurved, compressed, the mouth truncate, entire. *Hook.* Fl. Scot. 2. p. 114. *Jung.* t. 22. *Smith*, E. B. t. 225.

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.

18. J. *resupinata*, stem procumbent, nearly simple; leaves roundish, nearly equally 2-lobed, entire, lobes conduplicate; fruit terminal; calyx oblong, incurved, compressed, the mouth truncate, toothed. *Hook.* Fl. Scot. 2. p. 114. *Jung.* t. 23. *Smith*, E. B. t. 2437.

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.

19. J. *albicans*, stem erect, subdivided; leaves unequally 2-lobed, lobes conduplicate, with a pellucid line in the middle, serrated at the extremity, lower ones larger, subscymitar-shaped, upper ones oblong-ovate, acute; fruit terminal; calyx obovate, cylindrical, the mouth contracted, toothed. *Hook.* Fl. Scot. 2. p. 114. *Jung.* t. 25. *Smith*, E. B. t. 2240.

HAB. Heaths, moist rocks. Balmuto. Pentland Hills, frequent.

Plant growing in tufts or wide patches, of a pale green colour, or sometimes straggling 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.

20. J. *obtusifolia*, stem ascending, simple; leaves unequally 2-lobed, lobes conduplicate, obtuse, entire, lower ones larger, scymitar-shaped, superior ones ovate; fruit terminal; calyx obovate, the mouth contracted, toothed. *Hook.* Fl. Scot. 2. p. 115. *Jung.* t. 26. *Smith*, E. B. t. 2511.

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.

21. J. *complanata*, stem creeping, irregularly branched; leaves distichous, imbricated above, unequally 2-lobed, upper lobes larger, orbicular, lower ones ovate, appressed, plane, fruit terminal; calyx oblong, compressed, truncate. *Hook.* Fl. Scot. 2. p. 115. *Jung.* t. 81. *Smith*, E. B. t. 2499.

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.*

22. J. *polyanthos*, stem procumbent, somewhat branched; leaves horizontal, rotundato-quadrate, plane, entire and emarginate, stipules oblong, bifid; fruit upon very short branches, arising from the lower surface of the stem; calyx much shorter than the calyptra, 2-lipped, laciniate. *Hook.* Fl. Scot. 2. p. 116. *Jung.* t. 62. *Smith*, E. B. t. 2479.

HAB. Moist rocks and wet banks. Bilston Burn, G. Don.

Plant 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.

23. J. *scalaris*, stem creeping, simple; leaves round, concave, entire and emarginate; stipules broadly subulate; fruit terminal; calyx immersed in the leaves. *Hook.* Fl. Scot. 2. p. 115. *Jung.* t. 61. *Jung. lanceolata*, *Smith*, E. B. t. 605.

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 perichætial leaves.

24. J. *trichomanis*, stem creeping, subsimple; leaves horizontal, convex, ovate, entire and emarginate, stipules round, lunular-emarginate; fruit lateral; calyx subterraneous, oblong, fleshy, hairy, the mouth crenate. *Hook.* Fl. Scot. 2. p. 116. *Jung.* t. 79. *Smith*, E. B. t. 1875.

HAB. Shady places, banks, &c. frequent. Pentland Hills.

Plant 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 *gemmæ* 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. 116. *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.

26. J. *barbata*, stems procumbent, nearly simple, leaves roundish-quadrate, tri-quadrifid, stipules lanceolate, acutely bifid, their margins laciniate; fruit terminal; calyx ovate, contracted and toothed at the mouth. *Hook.* Fl. Scot. 2. p. 116. *Jung.* t. 70. J. *quinquedentata*, *Smith*, E. B. t. 2517.

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, subquadrate, 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.

28. J. *trilobata*, stem creeping, flexuose, branched; leaves imbricated above, ovate, convex, obtusely 3-toothed; stipules broadly subquadrate, crenate; fruit arising from the lower part of the stem; calyx oblong, subacuminate, the mouth cleft on one side. *Hook.* Fl. Scot. 2. p. 116. *Jung.* t. 76. J. *radicans*, *Smith*, E. B. t. 2232.

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 exserted. *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. *Peduncle* twice as long as the calyx. *Calyx* broadly obovate, with 5 longitudinal angles, the mouth much contracted.

††† *Lower or smaller segments saccate.*

32. J. *dilatata*, stem creeping, irregularly branched; leaves unequally 2-lobed, superior lobes ovate-rotundate, inferior ones rounded, saccate; stipules rounded, plane, emarginate; fruit terminal; calyx obcordate, tuberculate, triangular. *Hook.* Fl. Scot. 2. p. 118. *Jung.* t. 5. J. *tamariscifolia*, *Smith*, E. B. t. 1086.

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. *Peduncle* 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. *Peduncle* 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."

50. MARCHANTIA. *Micheli.*

1. M. *polymorpha*, fertile receptacle cleft into 7–10 narrow radiate segments, sterile one peltate, pedunculate. *Hook.* Fl. Scot. 2. p. 119. *Smith*, E. B. t. 210.

HAB. Moist or damp places, on the ground, rocks, or on the mould of garden-pots, plentiful.

Fronds 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 *gemmæ*, are scattered over the frond.

2. M. *hemisphærica*, 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. *Web.* and *Mohr*, Handb. p. 388.

Hab. Damp shady rocks and banks. Arthur's Seat, Mr J. Stewart. Craiglockhart. Rosslyn woods.

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.

3. M. *conica*, fertile receptacle entire, ovato-conical, sterile ones sessile, wart-like. *Hook.* Fl. Scot. 2. p. 120. *Smith*, E. B. t. 504.

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. *Thecæ* 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.

VII. CHARACEÆ*. *Hook. & Lindl.*

52. CHARA. *Vaill.*

1. C. *flexilis*, glabrous, pellucid; stems flaccid, much branched; whorls of branchlets simple, or divided towards the apex, obtuse, nucules few in the divisions of the upper branchlets. *Hook.* Fl. Scot. 2. p. 109. *Smith*, E. B. t. 2140.

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.

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* 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

2. C. *translucens*, smooth, pellucid, glabrous, flaccid; whorls of branchlets spreading, simple, suddenly acute, internally furnished with transverse partitions; nucules few. *Hook.* Fl. Scot. 2. p. 109. *Smith*, E. B. t. 1855.

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.

3. C. *vulgaris*, stems branched, rough, unarmed; whorls of branchlets ascending, subulate; fructification with 3–4 bracteas. *Hook.* Fl. Scot. 2. p. 109. *Smith*, E. B. t. 336.

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.

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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 sporules 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 ctuberculated receptacles.—Many species have vesicles which contain air, and are supposed to be destined to assist in supporting the plant.*

53. LAMINARIA. *Lamour.*

1. L. *esculenta*, frond membranaceous, simple, ensiform, with a central rib; stipes short, furnished with oblong, nerveless, spreading pinnæ, containing immersed pyriform sporules. *Ag.* Syn. p. 16. *Hook.* Fl. Scot. 2. p. 98. *Fucus esculentus*, *Turn.* Hist. Fuc. t. 117. *Smith*, E. B. t. 1759.

HAB. In the sea in deep water. Frith of Forth. Seafield rocks on the coast of Fife. ♃. Summer.

Root a few thick grappling fibres. *Stipes* short, pinnate; *pinnæ* 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 pinnæ, a portion of which is more fleshy than the rest.—Plant eaten in Scotland, and called *Badderlocks*.

2. L. *saccharina*, root strong grappling branched fibres; stipes subcylindrical, passing into a cartilagino-coriaceous, simple, plane, nerveless, entire frond; fructification scattered, immersed in the frond. *Ag.* Syn. p. 17. *Hook.* Fl. Scot. 2. p. 98. *Turn.* Hist. Fuc. t. 163.

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.*

δ, *attenuata*, stipes scarcely any; frond linear-lanceolate, membranaceous, pale yellowish-brown, the margin mostly waved. L. *Phyllitis*, *Ag.* Syn. p. 19. *Fucus phyllitis*, *Turn.* Hist. Fuc. t. 164. *Smith*, E. B. t. 1331.

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 rejectamenta. 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 bullated appearance, and sometimes both together. Var. δ, 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. Ag.* Syn. p. 18. et Sp. Alg. p. 113. *Hook.* Fl. Scot. 2. p. 99. *Fucus digitatus*, *Turn.* Hist. Fuc. t. 162. *Smith*, E. B. t. 2274.

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.*

1. F. *vesiculosus*, frond coriaceous, plane, linear, dichotomous, entire, with a central rib; vesicles innate, in pairs; receptacles distinct, terminal, turgid, mostly elliptical. *Ag.* Sp. Alg. p. 87. *Hook.* Fl. Scot. 2. p. 94. *Turn.* Hist. Fuc. t. 88. *Smith*, E. B. t. 1066.

β. *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. Franç.

ε. *Sherardi*, frond narrow, dwarfish; vescicles none; receptacles short oblong. *Fuc. Sherardi*, *Stackh. Ner. Brit.* p. 72. t. 13.

ζ. *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. ζ Opposite to Seafield Baths. ♃. Spring and summer.

Plant 3 inches to 3 feet long or more. *Root* a callous disk. *Frond* flat, dark olive-green, ¼th of an inch to 1 inch broad, dichotomously branched. *Receptacles* of *fructification* terminal, single or in pairs, turgid, the surface perforated; under the perforations are the tubercles 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.

2. F. *ceranoides*, frond coriaceous, linear, subdichotomous, entire, with a central rib, throwing out lateral, very narrow, fructifying branches; receptacles linear-acuminate, subcylindrical, often divided. *Ag.* sp. Alg. p. 93. *Hook.* Fl. Scot. 2. p. 96. *Turn.* Hist. Fuc. t. 89. *Smith*, E. B. t. 2115.

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, fastigiate, and terminating in a number of linear, narrow receptacles, having pores, with tubercles beneath, as in the preceding species.

3. F. *canaliculatus*, frond linear, nerveless, channelled, dichotomous; receptacles terminal, more or less oblong and divided. *Ag.* Sp. Alg. p. 96. *Hook.* Fl. Scot. 2. p. 96. *Turn.* Hist. Fuc. t. 3. *Smith*, E. B. t. 823.

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 tubercles containing sporules.

4. F. *nodosus*, frond compressed, coriaceous, furnished with innate solitary vesicles; receptacles obpyriform, lateral and distichous, on short peduncles. *Ag.* Sp. Alg. p 85. *Hook.* Fl. Scot. 2. p. 94. *Turn.* Hist. Fuc. t. 91. *Smith*, E. B. t. 570. *Halidrys nodosa*, *Lyngb.* p. 37. t. 8.

Hab. Rocky sea-shores. Frith of Forth, plentiful.

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.

5. F. *serratus*, frond coriaceous, flat, dichotomous, serrate at the margin, with a central rib; receptacles terminating the frond, solitary, flat, serrate. *Ag.* Sp. Alg. p. 95. *Hook.* Fl. Scot. 2. p. 95. *Turn.* Hist. Fuc. t. 96. *Smith*, E. B. t. 1221.

Hab. Rocky sea-shores. Frith of Forth, common. ♃. Spring and autumn.

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.*

Lyngb. Hydroph p. 36. t. 8. *Fucus loreus*, *Ag.* Sp. Alg. p. 98. *Hook.* Fl. Scot. 2. p. 96. *Turn.* Hist. Fuc. t. 196. *Smith*, E. B. t. 569.

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.*

1. C. *siliquosa*, coriaceo-cartilaginous; stipes compressed, pinnate; leaves distichous, plane, linear, entire; vesicles petiolated, jointed, linear-lanceolate; receptacles linear-lanceolate, alternate, pedunculated, compressed. *Ag.* Sp. Alg. p. 71. *Halidrys siliquosa*, *Lyngb.* Hydroph. p. 37. *Fucus siliquosus*, *Hook.* Fl. Scot. 2. p. 94. *Turn.* Hist. Fuc. t. 159. *Smith*, E. B. t. 474.

HAB. Rocky sea-shores, in small basins and pools among the rocks. Caroline Park, Maughan. Near Aberdour, and elsewhere on the Fife coast, frequent. ♃. Autumn to spring.

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.

2. C. *granulata*, frond many times dichotomous, furnished with small flexible spines; vesicles innate, elliptical, moniliform; receptacles terminal, elongated, filiform. *Ag.* Sp. Alg. p. 55. *Hook.* Fl. Scot. 2. p. 94. *Turn.* Hist. Fuc. t. 251. *Smith*, E. B. t. 2169.

HAB. Sea-shores. Frith of Forth, extremely rare. About Leith and Newhaven, Mr Yalden. (It has never been found since the time of Lightfoot.) ♃. 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.*

1. L. *pygmæa*, frond plane; tubercles sphærical. *Ag.* Sp. Alg. p. 105. *Hook.* Fl. Scot. 2. p. 96. *Turn.* Hist. Fuc. t. 204. figs. a–h. *Smith*, E. B. t. 1332.

HAB. Marine rocks. Coast of Fife. ♃. 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.

2. L. *confinis*, frond nearly cylindrical; tubercles elliptical. *Ag.* Sp. Alg. p. 105. L. *pygmæa*, β. *Hook.* Fl. Scot. 2. p. 96. et *Turn.* l. c. figs. i–o. *Lichen confinis*, *Smith*, E. B. t. 2575.

HAB. Marine rocks. Frith of Forth, at Caroline Park and elsewhere. ♃.

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.*

Ag. Syn. p. 10. *Hook.* Fl. Scot. 2. p 97. F. *fastigiata*, *Ag.* 5p. Alg. p. 103. *Fucus lumbricalis.* *Turn.* Hist. Fuc. t. 6. *Smith*, E. B. t. 826.

β. *fastigiata*, apices compressed, transparent, ovate-lanceolate, short, acute, *Turn.*

HAB. In small pools among marine rocks. Frith of Forth, frequently; β. occasionally. ♃. 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.*

Chordaria rotunda, *Ag.* Syn. p. 12. *Hook.* Fl. Scot. 2. p. 97. *Furcellaria rotunda*, *Lyngb.* Hydroph. p. 49. *Fucus rotundus*, *Turn.* Hist. Fuc. t. 5. *Smith*, E. B. t. 1738.

HAB. Sea-shores, in small pools among the rocks. Frith of Forth, very rare. Caroline Park, Mr E. Maughan. 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 *Furcellaria 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.*

1. S. *aculeatus*, frond linear, compressed, very much branched; branches alternate, with marginal subulate spines. (When young, feathery with pencil-like tufts of delicate filaments). *Ag.* Sp. Alg. p. 151. *Hook.* Fl. Scot. 2. p. 96. *Desmia aculeata*, Lyngb. p. 34. *Fucus aculeatus*, *Turn.* Hist. Fuc. t. 187. *Smith*, E. B. t. 2445.

HAB. Sea-shores, growing in deep water. Seafield rocks on the coast of Fife. In rejectamenta frequent. ♃. ? Spring and summer.

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.

2. S. *viridis*, stipes filiform, many times pinnate, with innumerable capillary branches, all of which are opposite, and the ultimate ones extremely fine. *Ag.* Sp. Alg. p. 154. *Chordaria viridis*, Ag. Syn. p. 14. *Hook.* Fl. Scot. 2. p. 98. *Fucus viridis*, *Turn.* Hist. Fuc. t. 97. *Smith*, E. B. t. 1669.

HAB. Rocks, sea-shores, generally in deep water. Frith of Forth. Near Caroline Park, Dr Richardson. Seafield Rocks on the Fife Coast, and near Dysart. ☉. Summer.

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 conferva-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.

3. S. *ligulatus*, frond submembranaceous, plane, nerveless, linear, bipinnate; branches and branchlets opposite, linear-lanceolate, attenuated at their base, and serrate with spinous teeth. *Ag.* sp. Alg. p. 158. *Desmia ligulata*, *Lyngb.* p. 33. *Laminaria ligulata*, *Hook.* Fl. Scot. 2. p. 99. *Fucus ligulatus*, *Turn.* Hist. Fuc. t. 98. *Smith*, E. B. t. 1636.

HAB. Marine rocks, in deep water, rare. About Newhaven, Lightfoot. Caroline Park, Mr E. Maughan. (Always in rejectamenta near Edinburgh.) ⊙. Summer.

Plant 2–5 feet long, brownish-olive, but changing to orange and to bright green when gathered, and decomposing other algæ 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.*

1. S. *filum*, frond perfectly simple, cylindrical, filiform, attenuated at each extremity, spirally twisted, slimy and cartilaginous. *Ag.* sp. Alg. p. 161. *Chorda filum*, *Lyngb.* p. 79. t. 18. *Chordaria filum*, *Hook.* Fl. Scot. 2. p. 98. *Fucus filum*, *Turn.* Hist. Fuc. t. 86. *Smith*, E. B. t. 2487.

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 shewn by dissection. *Fructification*, pyriform bodies covering the surface.—Sometimes found covered with conferva-like filaments, which, according to Agardh, denote the barren state of the plant.

62. CHORDARIA. *Agardh.*

1. Ch. *flagelliformis*, frond filiform, cartilaginous, slimy, cylindrical, very much branched; branches long, subdistichous, mostly simple, obtuse, more or less spreading. *Ag.* sp. Alg. p. 166. *Hook.* Fl. Scot. 2. p. 98. *Fucus flagelliformis*, *Turn.* Hist. Fuc. t. 85. *Smith*, E. B. t. 1222.

HAB. Rocky sea-shores. Frith of Forth, frequent. Newhaven, Lightfoot. Caroline Park, Dr Richardson. Plentiful on the Fife coast, between Pettycur and Kirkcaldy. ⊙. Summer.

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.*

1. G. *lycopodioides*, frond having 1–3 mostly simple, main stems, thickly covered with short, patent, filiform, ramuli, intermixed with capillary, elongate, fascicled branches; sporules in lanceolate receptacles, and globular tubercles. *Lyngb.* Hydroph. p. 45. *Furcellaria lycopodioides*, *Ag.* Syn. p. 11. *Hook.* Fl. Scot. 2. p. 97. *Fucus lycopod. Turn.* Hist. Fuc. t. 12. *Smith*, E. B. t. 1163.

HAB. In the sea, generally attached to the stems of Laminaria digitata, in deep water. Seafield 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.

2. G. *subfusca*, frond filiform, very much branched, the branches alternate, setaceous, spreading; fructification tubercles in the substance of the extremities of the branches, or external pedunculated receptacles. *Lamour.* *Lyngb.* p. 47. t. 10–11. *Sphærococcus subfuscus*, *Ag.* Syn. p. 32. *Hook.* Fl. Scot. 2. p. 104. *Fucus subfuscus*, *Turn.* Hist. Fuc. t. 10. *Smith*, E. B. t. 1164.

HAB. In the sea. Frith of Forth, common, on rocks and stems of large *Algæ*. ♃. 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

branches obtuse; tubercles lateral, sessile, wart-like. *Lamour. Lyngb.* p. 42. *Sphærococcus plicatus*, *Ag.* Syn. p. 34. *Hook.* Fl. Scot. 2. p. 104. *Fucus plicatus*, *Turn.* Hist. Fuc. t. 180. *Smith*, E. B. t. 1089.

HAB. Sea-shores, among rocks, frequent. Frith of Forth, chiefly on the Fife Coast. ♃. Autumn to spring.

Plant of a horny, 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 fastigiate, 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.

4. G. *purpurascens*, frond filiform, very much branched; branches setaceous, scattered, with spherical tubercles immersed in their substance. *Lamour. Lyngb.* p. 46. t. 12. *Sphærococcus purpurascens*, *Ag.* Syn. p. 31. *Hook.* Fl. Scot. 2. p. 104. *Fucus purpurascens*, *Turn.* Hist. Fuc. t. 9. *Smith*, E. B. t. 1243.

HAB. Sea-shores. Rocks between Newhaven and Caroline Park and elsewhere, in the Frith of Forth, 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.*

1. Ch. *purpurascens*, frond purplish, subgelatinous, branched, filiform; branches remote, long, mostly simple and attenuated at their base and extremity; fructification, naked sporules in substance of the branches. *Ulva? purpurascens*, *Hook.* Fl. Scot. 2. p. 92. *Gastridium filiforme*, *Lyngb.* p. 68. t. 17. *Ulva filiformis*, *Ag.* Syn. p. 47.

β. *incrassata*, apices of the branches incrassated. *Ulva incrassata*, *Ag.* Syn. p. 47.

HAB. Sea-shores. Frith of Forth, 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.

2. Ch. *obtusa*, frond subcartilaginous, cylindrical, filiform, repeatedly subpinnate; branches mostly opposite, spreading, the ultimate ones truncate; tubercles ovate, sessile, and naked sporules in the ramuli. *Ag.* Syn. p. 35. *Hook.* Fl. Scot. 2. p. 105. *Fucus obtusus*, *Turn.* Hist. Fuc. t. 21. *Smith*, E. B. t. 1201.

HAB. Sea-shores, on other algæ. Rare in the Frith of Forth. Messrs J. Stewart and Greville. ☉. 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-quadri-pinnate; the lower branches the longest; the ultimate divisions very short, obtuse, somewhat clustered. *Sporules* of the *tubercles* pyriform; those immersed in the frond, orbicular.

3. Ch. *pinnatifida*, frond compressed, subcartilaginous, divided and subdivided in a pinnate manner, extremities of the branches obtuse, callous; tubercles ovate, sessile, and naked sporules in the frond. *Ag.* Syn. p. 35. *Hook.* Fl. Scot. 2. p. 105. *Gelidium pinnatifidum*, *Lyngb.* p. 40. t. 9. *Fucus pinnatifidus*, *Turn.* Hist. Fuc. t. 20. *Smith*, E. B. t. 1202.

β. *osmunda*, frond flat, generally undivided; ramuli short and multifid.

HAB. Rocks in the sea. Frith of Forth. α. Frequent. β. Not plentiful nearer than Dunbar. ☉. Summer.

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 pinnæ spreading. *Substance* cartilaginous, subdiaphanous.—Eaten in Scotland; has a pungent flavour.

4. Ch. *clavellosa*, frond subgelatinous, cylindrical, much branched; branches and branchlets alternate, subdistichous; fructification either sessile tubercles, or scattered sporules in the ultimate ramuli. *Hook.* Fl. Scot. 2. p. 105. *Gastridium clavell. Lyngb.* p. 70. *Fucus clavell. Turn.* Hist. Fuc. t. 30. *Smith*, E. B. t. 1203.

HAB. Sea-shores. Frith of Forth; on the Leith sands, Dr Richardson. About Caroline Park. July, August. ☉.

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.

5. Ch. *articulata*, frond cylindrical, contracted throughout as if jointed, branched; branches regular, whorled, dichotomous; fructification either urceolate, sessile tubercles, or scattered sporules in the ramuli. *Hook.* Fl. Scot. 2. p. 106. *Lomentaria articulata*, *Lyngb.* p. 101. t. 30. *Fucus articulat. Turn.* Hist. Fuc. t. 106. *Smith*, E. B. t. 1574.

HAB. Rocks in the sea, and on the larger *algæ*. Frith of Forth, frequent. Summer. ☉.

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 moniliform manner, but not absolutely jointed. *Colour* reddish pink or purplish. *Substance* somewhat gelatinous, transparent.

6. Ch. *Opuntia*, frond subcylindrical, contracted as if jointed, branched, reticulated within by a mass of jointed filaments; branches spreading; fructification minute, blackish, scattered tubercles. *Hook.* Fl. Scot. 2. p. 106. *Fucus Opuntia, Turn.* Hist. Fuc. t. 107. *Rivularia Opuntia, Smith*, E. B. t. 1868.

HAB. Marine rocks. Musselburgh, Lightfoot. Caroline Park coast, and on the coast of Fife in various places. ♃. 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.

7. Ch. *pusilla*, frond between cartilaginous and horny, compressed, filiform, somewhat contracted here and there, branched, branches attenuated at their base, but dilated and rounded at their extremity; fructification either minute tubercles or scattered sporules in the ramuli. *Hook.* Fl. Scot. 2. p. 106. *Grev.* Crypt. Fl. t. 79. *Fucus pusillus, Turn.* Hist. Fuc. t. 108.

HAB. Marine rocks. Rocks by Caroline Park, Dr Richardson, 1819. (This is the station given by me in Dr Hooker's *Flora Scotica*, but I did not then know that my friend Dr Richardson had found it). ♃. 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.*

1. D. *sanguinea*, stipes cylindrical, branched, producing distinct, petiolated, oblongo-ovate, entire leaves; fructification, either naked sporules in leafy processes, or pedunculated tubercles on the midrib. *Hook.* Fl. Scot. 2. p. 100. *Ag.* Syn. p. 21. *Fucus sanguineus, Turn.* Hist. Fuc. t. 36. *Smith*, E. B. t. 1041.

HAB. Sea-shores. Frith of Forth, not unfrequent. January—May. ♂.

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.

2. D. *sinuosa*, stipes cylindrical, branched, very short, producing membranaceous leaves, variously sinuate or pinnatifid; fructification either naked sporules in leafy processes, fringing the margin of the frond, or innate tubercles. *Hook.* Fl. Scot. 2. p. 100. *Ag.* Syn. p. 21. *Fucus sinuosus, Turn.* Hist. Fuc. t. 35. *Smith*, E. B. t. 822.

HAB. Sea-shores, mostly attached to the stipes of larger algæ. 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.

3. D. *alata*, frond linear, very much branched, subdichotomous, with a midrib, the segments alternately pinnate; sporules either naked in the apices of the frond, or in sessile tubercles. *Hook.* Fl. Scot. 2. p. 100. *Ag.* Syn. p. 22. *Fucus alatus*, *Turn.* Hist. Fuc. t. 160. *Smith*, E. B. t. 1837.

HAB. Sea-shores. Frith of Forth, plentiful. January—August. ♂?

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.

HAB. Sea-shores. Frith of Forth, very rare. Opposite Seafield Baths, Dr Richardson. Near Caroline Park. June—September. ☉.

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.

5. D. *lacerata*, frond membranaceous, very tender, subdichotomous, veins most obvious towards the base; branches sublinear, rounded at the apex, waved at the margin; sporules in naked oblong clusters, or in immersed tubercles. *Hook.* Fl. Scot. 2. p. 101. *Fucus laceratus*, *Turn.* Hist. Fuc. t. 68. *Smith*, E. B. t. 1067.

HAB. Sea-shores. Frith of Forth, Lightfoot. Rarely in rejectamenta, Mrs Martin. ♃? July—October.

Root, a small disk. *Fronds* thin, membranaceous, single or several from the same base, 3–7 inches long, branched, branches linear, subdichotomous, ¼–½ 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-*

rococcus? lacin. Hook. Fl. Scot. 2. p. 103. *Lyngb.* p. 12. *Fucus lacin. Turn.* Hist. Fuc. t. 69. *Smith*, E. B. t. 1068.

HAB. Sea-shores. Frith of Forth, but not frequent near Edinburgh, and always in rejectamenta. ♃? February—July.

Plant of a beautiful opaque pink-red. *Root* a small disk. *Fronds* often several from the same base, 3–7 inches long, divided in a fan-like manner into branches which are ¼ of an inch to 1 inch broad. When the margin is entire, naked sporules are generally found, giving it a darker colour. When fringed with leafy processes, they often contain tubercles: the two kinds of fructification are found by my acute friend Mrs Griffiths to be always on distinct plants, as in other cases of double fructification.

7. D. *punctata*, frond membranaceous, very tender, flat, nerveless, mostly dichotomous, segments nearly linear, bifid and obtuse at their apices, at their margins flat and entire; sporules either naked in oblong spots, or in scattered hemispherical immersed tubercles. *Turn. Hook.* Fl. Scot. 2. p. 101. *Fucus punct. Turn.* Hist. Fuc t. 71. *Smith*, E. B. t. 1573.

HAB. Sea-shores. Frith of Forth, among rejectamenta, very rare. Summer. ☉.

Plant of a very delicate structure, extremely thin, and finely reticulated. *Root* a minute disk. *Frond* spreading immediately from the root, 2–6 inches long, the divisions either commencing at the base, or about the middle; each division being divided and subdivided, and becoming narrower. *Colour* a bright delicate rose-pink, glossy when dry.

8. D. *coccinea*, frond compressed, membranaceo-cartilaginous, much branched; branches linear; ultimate branchlets subulate and pectinate; sporules in pod-like processes from the ramuli, or spherical, sessile, lateral tubercles. *Ag.* Syn. p. xiv. *Hook.* Fl. Scot. 2. p. 101. *Plocamium coccineum*, *Lyngb.* p. 39. t. 9. *Fucus coccineus*, *Turn.* Hist. Fuc. t. 59. *Smith*, E. B. t. 1242.

HAB. Sea-shores. Frith of Forth, plentiful. ♃? June—October.

Root a minute disk, accompanied by a few fibres. *Frond* 3–9 inches long, very much and irregularly branched; branches about half a line broad. *Colour* a beautiful deep pink. *Spherical tubercles* chiefly on the main and secondary branches, often axillary.—I consider the "lanceolate siliquæ" of Mr Turner as simple frondose processes, for such they appear under the microscope; were they not so, the plant would scarcely belong to this genus.

66. SPHÆROCOCCUS, *Agardh.*

1. Sph. *crispus*, frond cartilaginous, dichotomous, ribless, the margin curled, entire; branches dilating upwards; tubercles solitary, scattered, immersed, concave on one side, deciduous. *Hook.* Fl. Scot. 2. p. 102. *Ag.* Syn. p. 24. *Chondrus crispus*, *Lyngb.* p. 15. *Fucus crispus*, *Turn.* Hist. Fuc. t. 216, 217.

γ, *stellatus*, frond submembranaceous; branches dilated upwards, divided at their apices into very numerous, clustered, shortish laciniæ. *Turn.*

δ, *æqualis*, frond cartilaginous, thick, all the branches equal and linear, the extreme segments obtuse. *Turn. Fucus crispus*, *Smith*, E. B. t. 2285.

ϑ, *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, plentifully. ♃. 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.

2. Sph. *mammillosus*, frond cartilaginous, channelled on one side, ribless, dichotomous; branches dilated upwards, entire; tubercles on the frond, numerous, shortly pedunculate. *Hook.* Fl. Scot. 2. p. 102. *Ag.* Syn. p. 25. *Fucus mammill. Turn.* Hist. Fuc. t. 218. *Smith*, E. B. t. 1054.

HAB. Sea-shores. Frith of Forth, plentiful. ♃. 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.

3. Sph. *membranifolius*, stipes cylindrical, branched, expanding into a plane, divided, dichotomous, membranaceo-cartilaginous frond without a nerve; tubercles oblong, pedunculate, growing mostly on the stem. *Hook.* Fl. Scot. 2. p. 103. *Ag.* Syn. p. 26. *Fucus memb. Turn.* Hist. Fuc. t. 74. *Smith*, E. B. t. 1965.

HAB. Sea-shores, on rocks in small pools. Frith of Forth, frequent. ♃. Oct.—Jan.

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.

4. Sph. *Brodiæi*, stipes cylindrical, branched, expanding into a submembranaceous nerveless frond, which is more or less divided, and branched in a proliferous manner from the margin; branches attenuated at their base, and bearing sessile tubercles at their apex. *Hook.* Fl. Scot. 2. p. 103. *Ag.* Syn. p. 27. *Fucus Brodiæi Turn.* Hist. Fuc. t. 72. *Smith*, E. B. t. 1966.

HAB. Rocks in the sea. Frith of Forth, rather rare. Near Caroline Park, Mr J. Stewart. Joppa and Portobello, Dr Richardson. Black Rocks, Leith. ♃.? Summer and autumn.

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.

5. Sph. *rubens*, frond somewhat membranaceous, flat, arising from a very short cylindrical filiform stipes; branches elliptical-linear, dichotomous, proliferous from the surface; tubercles rugose, hemispherical, sessile on the frond. *Hook.* Fl. Scot. 2. p. 103. *Ag.* Syn. p. 27. *Chondrus rubens*, *Lyngb.* p. 18. *Fucus rubens*, *Turn.* Hist. Fuc. t. 18. *Smith*, E. B. t. 1053.

HAB. Sea-shores. Frith of Forth, among rejectamenta, rare. ♃. Chiefly in the winter.

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.

6. Sph. *cristatus*, frond plane, membranaceous, veinless, subdichotomous; branches linear, somewhat dilated upwards, and cleft towards the extremities, the segments short, obtuse, bearing small, globular, sessile tubercles. *Grev.* Crypt. Fl. t. 85. *Ag.* Syn. p. 29. *Fucus cristatus*, *Turn.* Hist. Fuc. t. 23. excl. β. and γ. (not of E. B. t. 1925.)

HAB. Sea-shores, rare. Frith of Forth, near Caroline Park, among rejectamenta. (Only one specimen, July 1823). ☉. ? Summer.

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.

7. Sph. *corneus*, frond corneo-cartilaginous, compressed, irregularly branched; branches linear, attenuated at each end, bipinnate, the pinnæ opposite, patent, obtuse, bearing towards their apices elliptical tubercles; *Turn. Hook.* Fl. Scot. 2. p. 104. *Fucus corneus*, *Turn.* Hist. Fuc. t. 257. *Smith*, E. B. t. 1970.

HAB. On marine rocks. Frith of Forth, rare, Lightfoot.

Root partly a disk, and partly fibrous. *Fronds* very numerous, 2–6 inches long, ribless, compressed, once to thrice pinnate, 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*.

Lyngb. p. 9. t. 3. *Sphærococcus dent. Hook.* Fl. Scot. 2. p. 102. *Ag.* syn. p. 22. *Fucus dent. Turn.* Hist. Fuc. t. 13. *Smith*, E. B. t. 1241.

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, obsoletely 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 ciliæ, 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.*

1. Pt. *plumosa*, frond compressed, cartilaginous, much and irregularly branched; branches repeatedly pinnate; ramuli opposite; sporules naked, surrounded by the quadrifid ends of the ramuli, *Turn. Hook.* Fl. Scot. 2. p. 107. *Ag. Syn.* p. 39. *Fucus plumosus, Turn.* Hist. Fuc. t. 60. *Smith*, E. B. t. 1308.

β. *capillaris*, frond flaccid, very narrow, nearly cylindrical, jointed. *Turn.*

HAB. Sea-shores. Frith of Forth, Maughan. α. Upon the stems of the large algæ. β. Always on perpendicular sides of rocks. ♃. June—Oct.

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 *flustræ* and *sertulariæ*, as α. is almost invariably. The fructification hitherto has been found unaccompanied by an involucre. Is it not distinct?

DIV. III. ULVOIDEÆ. *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.*

1. Z. *dichotoma*, frond membranaceous, olive green, branched; branches dichotomous, linear, obtuse; fructification in dots, arranged longitudinally. *Ag.* sp. Alg. v. 1. p. 133. *Hook.* Fl. Scot. 2. p. 90. *Ulva dichotoma, Smith*, E. B. t. 774.

HAB. In the sea, on rocks and various marine plants. Black Rocks Leith, and about Newhaven, Lightfoot. Aberdour. ☉. 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.

2. Z. *atomaria*, frond membranaceous, greenish brown, flabelliform, cleft in an irregularly palmate manner, the segments linear; fructification forming concentric lines. *Ag.* sp. Alg. v. 1. p. 128. *Ulva atomaria*, *Woodward. Smith*, E. B. t. 419.

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.*

1. U. *edulis*, frond coriaceo-cartilaginous, deep dull red, simple, entire, cuneiform, rounded at the apex, attenuated at the base into a very short cylindrical stipes. *Decand. Lyngb.* p. 26. *Halymenia edulis*, *Hook.* Fl. Scot. 2. p. 107. *Fucus edulis*, *Turn.* Hist. Fuc. t. 114. *Smith*, E. B. t. 1307.

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.

2. U. *palmata*, frond membranaceo-coriaceous, dull purplish red, palmate, margins entire, segments oblong, mostly simple. *De Cand. Lyngb.* p. 24. *Halymenia palmata*, *Ag.* Syn. p. 36. *Hook.* Fl. Scot. 2. p. 107. *Fucus palmatus*, *Turn.* Hist. Fuc. t. 115. *Smith*, E. B. t. 1306.

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.*

3. U. *umbilicalis*, frond very membranaceous, transparent, suborbicular or oblong, mostly umbilicate, sessile, plicate, dull purplish. *Linn. Lyngb.* p. 28. *Hook.* Fl. Scot. 2. p. 90. *Smith*, E. B. t. 2286.

β. *elongata*, frond elongated, oblong-lanceolate, the margin waved. *U. purpurea*, *Roth. Ag.* Syn. p. 42. *Lyngb.* p. 29.

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. *Fructification* according to the figure in E. B., irregular clusters of very minute sporules.—Variously prepared as food.

4. U. *Lactuca*, fronds aggregate, roundish-oblong, waved, fine green, suddenly attenuated at the base, spreading, waved, and more or less laciniate at the margin. *Linn. Ag.* Syn. p. 40. *Hook.* Fl. Scot. 2. p. 90. *Smith*, E. B. t. 1551.

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.

5. U. *Linza*, frond linear-lanceolate, pale green, waved and crisped at the margin, attenuated below into a very short subcylindrical stipes. *Ag.* Syn. p. 40. *Hook.* Fl. Scot. 2. p. 91.

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.

6. U. *plantaginifolia*, fronds aggregate, olive brown, lanceolate, obtuse, simple, plane, and mostly entire at the margin, attenuated at the base. *Wulf.* *U. plantaginea*, *Lyngb.* p. 31. t. 6. *Smith*, E. B. t. 2136. *Laminaria plantaginea*, *Ag.* Syn. p. 20.

HAB. Marine rocks. Frith of Forth, at Caroline Park, and on the Fifeshire 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, irregularly scattered over the frond.

7. U. *crispa*, fronds crowded, deep green, bullate, much wrinkled and plicate, rounded, very thin. *Lightf. Ag.* Syn. p. 43. *Hook.* Fl. Scot. 2. p. 91. U. *terrestris*, *Lyngb.* p. 32. t. 6.

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.*

1. F. *intestinalis*, frond linear, tubular, simple, much wrinkled, and sinuate. *Ulva intestinalis*, *Linn.* *Ag.* Syn. p. 45. *Hook.* Fl. Scot. 2. p. 91. *Scytosyphon intestinalis*, *Lyngb.* p. 67.

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.

2. F. *compressa*, frond tubular, green, simple, or irregularly branched, linear or filiform, compressed. *Ulva compressa*, *Linn.* *Ag.* Syn. p. 45. *Hook.* Fl. Scot. 2. p. 91. *Smith*, E. B. t. 1739., and *U. ramulosa*, t. 2137. *Scytosiphon compressus*, *Lyngb.* p. 64. t. 15.

HAB. In the sea. Frith of Forth, abundantly. ⊙. Summer.

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. ⊙. Summer.

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 flagelliformis*. *Substance* tender. It appears cylindrical under the microscope, and reticulated, but I have not seen the sporules, nor has Lyngbye described them.

4. F. *attenuata*, frond cylindrical, brown, filiform, attenuated at each extremity, simple, tubular, subcoriaceous. *Scytosiphon fistulosum*, *Lyngb.* p. 66. *Chordaria filum*, *β. fistulosa*, *Ag.* Syn. p. 14. *Ulva fistulosa*, *Hook.* Fl. Scot. 2. p. 92. *Smith*, E. B. t. 642.

HAB. In the sea, attached to rocks, stones, shells, &c. Frith of Forth, near Pettycur and Kirkaldy. ⊙. Summer.

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-

like knots at regular intervals; knots subternate. *Link* in Shrad. Journ. 1809. p. 9. *Lyngb.* p. 99. *Lemania fluv. Ag. Hook.* Fl. Scot. 2. p. 84. *Conf. fluviat. Dillw.* t. 29. *Smith*, E. B. t. 1763.

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.*

1. Gl. *fœtidum*, filaments minute, continuous, irregularly branched, granuliferous within; granules cylindrical-ovate, scattered. *Ag. Hook.* Fl. Scot. 2. p. 78. *Conferva fœtida, Dillw. Conf.* t. 104. *Smith*, E. B. t. 2101. *Bangia quadripunctata, Lyngb.* p. 86. t. 26.

HAB. Rocks and stones in the sea. Frith of Forth, plentiful. Spring and Summer.

Plant of an olive or brownish green, growing in conferva-like tufts, 1–2 inches long, the filaments much entangled, very flaccid, 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.

2. Gl. *apiculatum*, filaments minute, continuous, erect, branched, often in a fasciculate manner, containing cylindrical-oblong scattered granules; apex of the branches incrassated and apiculate. *Grev.* Crypt. Fl. t. 30.

HAB. In the sea, in rocky basins. Black Rocks, Leith, and Near Newhaven, rare. Spring.

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.

HAB. Rocky basins in the sea. Black Rocks, Leith; on marine plants, rare. Summer.

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-

ous, simple, somewhat torulose, granuliferous; granules spherical, arranged in a dense transverse series. *Lyngb.* p. 83. t. 24. *Conf. fusco-purpurea*, *Dillw.* t. 92. *Conf. atro-purpurea*, *Dillw.* t. 103. *Smith*, E. B. t. 2085.

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.

2. B. *Laminariæ*, filaments equal, continuous, simple, short, tufted; sporules very minute, in a double series, and forming transverse striæ. *Lyngb.* p. 84. t. 24.

HAB. On the frond of *Laminaria esculenta*. Frith of Forth, Mr Walker Arnott. Near Burntisland, on *Ulva plantaginifolia*.

Tufts minute, 1–2 lines long, of an olive green colour. *Filaments* several from the same base, crowded, very fine. *Sporules* globose.

3. B. *atro-virens*, filaments continuous, rigid, branched; branches irregular, divaricate; granules (sporules) arranged transversely, subequidistant. *Lyngb.* p. 85. t. 25. *Scytonema*, *atro-virens*, *Ag.* Syn. p. 115. *Conf. atro-virens*, *Dillw.* t. 25. *Cornicularia pubescens*, *Ach.* Syn. p. 302.

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; ramuli somewhat attenuated, and often subsecund. *Colour* under the microscope olivaceous-yellow or brownish.

75. SCYTONEMA. *Agardh.*

1. Sc. *ocellatum*, filaments branched, greenish brown or blackish, minute, densely interwoven into broad masses; branches mostly binate, secund; within moniliform, orange yellow under the microscope. *Lyngb.* p. 97. t. 28. *Conf. ocellata*, *Dillw.* Suppl. t. D. *Smith*, E. B. t. 2530.

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.

2. Sc. *compactum*, filaments decumbent, branched, densely interwoven into blackish tufts; branches suberect, dichotomous and fasciculate; within furnished with transverse rings. *Ag.* Syn. p. 116. *Lyngb.* p. 97. t. 28.

HAB. Moist rocks. Pentland Hills, near Habbie's How, Messrs Arnott and Greville. Near Burntisland.

Tufts an inch broad or more, blackish. *Filaments* 1–4 lines long, decumbent, the apex erect, where they are most branched; branches often cur-

ved. *Substance* scarcely rigid. *Colour* under the microscope orange yellow, in very old plants brownish.

3. Sc. *Bangii*, filaments simple, erect, flexuose, spirally twisted into pointed masses, greenish above, brownish below; within often moniliform. *Lyngb.* p. 98. t. 28.

HAB. Shady subalpine banks, intermixed with mosses. Habbie's How, in the Pentland Hills. Summer.

Filaments growing in compact tufts, 1–2 inches high, of a dull, but somewhat æruginous green, more or less tortuose, and as it were adglutinated. Under the microscope they are found to be either hyaline or beaded within, of a somewhat rigid nature, and greyish, or tinged with blueish 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 2 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 striæ* crowded, very distinct.

2. O. *tenuis*, filaments straight, rigid, simple, pale blueish green, radiating shortly from a dark green stratum; transverse striæ, equal in length to the diameter of the filament. *Ag.* Syn. p. 105. *Lyngb.* p. 88. O. *limosa*, *Hook.* Fl. Scot. 2. p. 79. *Conf. limosa*, *Dillw.* t. 20. (fig. B. incorrect). *Smith*, E. B. t. 2053 ??

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. *Striæ* difficult to perceive, in which, as well as in the much slenderer filaments, it differs strikingly from the preceding.

3. O. *corium*, filaments very slender, simple, yellowish, or pale brownish, lying in a compact, rather thin, subcoriaceous brown stratum. *Ag.* Syn. p. 107. *Lyngb.* p. 89.

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 striæ inconspicuous from their fineness.

4. O. *ochracea*, filaments simple, very slender, greenish, lying in a thick, very tender, fragile, ochraceous stratum. *Lyngb.* p. 89. t. 26. *Conf. ochracea*, *Dillw.* t. 62.

Hab. In pools and boggy places, frequent. About Edinburgh.

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 striæ are perceived with difficulty.

†† *Filaments destitute of a slippery stratum.*

5. O. *splendida*, filaments exceedingly minute, densely entangled, of a splendid deep æruginous green colour; transverse striæ wholly invisible, from the minuteness of the filaments.

Hab. In tubs of water in the stove of the Botanic Garden.

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 blueish colour.—It has the colour and external character of Oscill. *major*, but cannot be confounded with it when magnified.

** *Marine.*

6. O. *scopulorum*, filaments olive green, simple, very short, somewhat rigid, forming dense tufts. *Ag.* Syn. p. 111. *Hook.* Fl. Scot. 2. p. 79. *Conf. scopulorum*, *Dillw.* Suppl. t. A. *Smith*, E. B. t. 2171.

Hab. Marine rocks. Frith of Forth, Messrs Arnott and Greville. Summer.

Tufts very dense and broad, dark green. *Filaments* 1–3 lines long, fine as a human hair, with very numerous, dark transverse striæ, some of which are broader than the rest.

*** *Subterrestrial, (growing on the ground, damp walls, or wood).*

7. O. *muralis*, filaments green, thickish, rather rigid, curved and flexuose, forming broad, closely interwoven masses. *Ag.* Syn. p. 108. *Hook.* Fl. Scot. 2. p. 79. *Conf. muralis*, *Dillw.* t. 7. *Smith*, E. B. t. 1554.

Hab. On damp walks, 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 striæ, closely arranged.

8. O. *decorticans*, filaments very slender, blue-green, flexuose, densely interwoven into thin masses. *Lyngb.* p. 95. *Conf. decorticata*, *Dillw.* t. 26.

Hab. Damp wood, as old pumps and aqueducts. Also on walls. About St Bernard's Well. March.

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 striæ not so visible. Dillwyn says they are about equal in length to the thickness of the filaments.

9. O. *autumnalis*, filaments pale blue-green, straight, somewhat rigid, shortly radiating from a purplish-black, very thin, lubricous stratum. *Ag.* Syn. p. 106. *Lyngb.* p. 95.

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. *muralis*. *Filaments* half the diameter of that species, shortly radiating, the transverse striæ nearly as distant as the diameter of the filament, and not very perceptible.

77. VAGINARIA. *Gray.*

1. V. *chthonoplastes.*

Gray's Nat. Arr. v. 1. p. 280. *Oscill. chthonoplastes, Hoff. Bang. de Usu Conf.* with a figure, p. 19. *Lyngb.* p. 92. t. 27. *Conferva vaginata, Dillw.* t. 99. *Smith*, E. B. t. 1995.

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 pellucid 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 *Oscillatoriæ*, to which this wonderful plant is nearly allied. I have not been able to observe striæ or dissepiments.

DIV. IV. VAUCHERIDEÆ. *Plants tubular, capillary or filiform, continuous, membranaceous, branched, of a green colour. Fructification either very minute sporules, dispersed in an internal green mass, or external, viviparous (?) vesicles of the same nature as the frond.—Marine, fresh-water, and terrestrial plants.*

78. VAUCHERIA. *De Cand.*

* *Vesicles solitary.*

1. V. *dichotoma*, filaments erect, dichotomous, the branches very long; vesicles globose, sessile. *Ag.* Syn. p. 48. *Conf. dichotoma, Dillw.* t. 15. *Smith*, E. B. t. 932.

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.

2. V. *Dillwynii*, terrestrial; filaments very slender, flexuose, branched, densely interwoven; vesicles subsessile, solitary, globose. *Ag.* Syn. p. 50. *Hook.* Fl. Scot. 2. p. 93. *Conf. frigida, Dillw.* t. 16.

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.

3. V. *granulata*, terrestrial; filaments none, excepting a few radicating ones; vesicles solitary, globose, terminal, sessile on the ground. *Ag.* Syn. p. 52. *Hook.* Fl. Scot. 2. p. 93. *Tremella granulata*, *Smith*, E. B. t. 324.

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 *Vaucheriæ*. *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.*

4. V. *ornithocephala*, filaments loosely branched, in large entangled masses; vesicles mostly in pairs, ovate, oblique, shortly beaked, subsessile, or on a short straight peduncle. *Ag.* Syn. p. 49. *Hook.* Fl. Scot. 2. p. 92. *Conf. vesicata*, *Dillw.* t. 74.

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 *Vaucheriæ*.

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.

6. V. *racemosa*, filaments capillary, in floating masses; vesicles in racemose, pedunculated clusters. *Ag.* Syn. p. 50. *Lyngb.* p. 81. t. 23.

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.

79. BRYOPSIS. *Lamour.*

1. B. *plumosa*, frond fine green, gelatinous, filiform, compressed, branched; branches pinnate, the pinnæ parallel, shining, becoming shorter towards the apex. *Ulva plumosa*, *Huds. Smith*, E. B. t. 2375.

HAB. In the sea, in rocky basins, not common. Frith of Forth at Joppa, Dr Richardson. Between Newhaven and Caroline Park.

Plant 1–3 inches long, and as many broad, of a fine green colour, shining when dry, the main stem and branches paler, and pellucid. *Branches* closely pinnate or bipinnate, finely plumose, apices of the pinnæ obtuse. The green mass within probably contains the sporules. It adheres most closely to paper.

DIV. V. ECTOCARPOIDEÆ. *Frond filiform or capillary, jointed, membranaceous or subcoriaceous, mostly of an olive-green or fine red colour. Fructification external tubercles containing sporules, or occasionally innate ones towards the apex of the ramuli.—Marine plants, with very few exceptions.*

SECT. I. *Frond more or less of a red colour.*

80. ASPEROCAULON *. *Grev.*

1. A. *Arbuscula*, frond reddish-purple, much branched, naked below; the stem and main branches incrassated, inarticulate; ramuli short, crowded, multifid, jointed, articulations about as long as broad. *Hutchinsia Arbusc. Ag.* Syn. p. xxvi. *Hook.* Fl. Scot. 2. p. 89. *Callithamnion Arbusc. Lyngb.* p. 123. *Conf. Arbusc. Dillw.* t. 85. *Smith*, E. B. t. 1916.

HAB. Marine rocks. Frith of Forth, Messrs Arnott and Greville. Opposite Caroline Park, Dr Richardson. Summer.

Gregarious. *Root* a small disk, from which several fronds arise, 1–3 inches long, the main branches not jointed, firm, villose. *Smaller branches* very short, excessively crowded, subverticillate, joints as long as broad, containing a single fine red tube. *Fructification* minute, round, tubercles secund, on the inner side of the ramuli, and larger lanceolate ones, containing several series of red granules.

2. A. *coccineum*, frond much branched, pink-scarlet, subcartilaginous, naked, jointless and villose below; branches alternate, doubly pinnate, pinnuli tufted; articulations subequal in length and breadth. *Hutchinsia coccinea*, *Hook.* Fl. Scot. 2. p. 89. *Callithamnion cocc. Lyngb.* p. 124. *Conf. cocc. Dillw.* t. 36. *Smith*, E. B. t. 1055.

HAB. Sea-shores. Frith of Forth, among rejectamenta, rare. Near Kirkcaldy. Summer.

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* 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, which, 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.

2. P. *fucoides*, bushy, very dark; filaments excessively branched, rigid below; branchlets capillary, alternate, attenuated, subfasciculate; joints of the branchlets about as long as broad; tubercles ovate, subsessile. *Hutchinsia fucoides*, *Hook.* Fl. Scot. 2. p. 87. *H. violacea*, *Ag.* Syn. p. 54. *Conf. fucoides*, *Dillw.* t. 75. *Smith*, E. B. t. 1743. *Conf. nigrescens*, *Smith*, E. B. t. 1717.?

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; *striæ* 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 striæ several. *Hutchinsia atro-rubescens*, *Ag.* Syn. p. 58. *Conf. atro-rubesc. Dillw.* t. 70.

HAB. Marine rocks. Frith of Forth, not frequent. Wardie, Dr Richardson. Caroline Park. Summer.

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-

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* 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.

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 capillary, 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 algæ. 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 striæ. *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; pinnulæ subulate; articulations about equal in length and breadth, striæ 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 pinnulæ 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 thrice 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 algæ, 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. *Striæ* 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.

7. P. *stricta*, filaments straight, equal, capillary, with dichotomous, erect branches, which become fasciculate towards the top; articulations 3–4 times longer than broad. *Hutchinsia stricta*, *Ag.* Syn. p. 56. *Hook.* Fl. Scot. 2. p. 88. *Conf. stricta*, *Dillw.* t. 40.

HAB. Marine rocks. Frith of Forth, near Kirkcaldy. Opposite Caroline Park, and elsewhere. Summer.

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.

HAB. Sea-shores, rare. Caroline Park, Dr Richardson. Near Kirkcaldy. In both instances among rejectamenta. July.

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.*

1. C. *elongatum*, robust, much branched; branches elongated, straight, somewhat rigid, the ramuli setaceous; articulations shorter than their breadth, reticulated with veins. *Lyngb.* p. 117. t. 36. *Hutchinsia elongata*, *Hook.* Fl. Scot. 2. p. 87. *Conf. elongata*, *Smith*, E. B. t. 2429. *Dillw.* t. 33.

HAB. Marine rocks, and on shells and stones. Common. Frith of Forth.

Lobster-horn Ceramium.—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*, *Dillw.* t. 34. *Smith*, E. B. t. 1166.

HAB. On many of the larger algæ, and on rocks. Very common. Frith 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.

3. C. *diaphanum*, dichotomous, membranaceous; branched, numerous, divaricated, the ramuli forcipate at the apex; articulations cylindrical, hyaline, the joints red and swollen; tubercles sessile, with an involucre. *Ag.* Syn. p. 61. *Hook.* Fl. Scot. 2. p. 85. *Conf. diaphana*, *Dillw.* t. 38. *Smith*, E. B. t. 1742.

HAB. Sea-shores in rocky basins, on various algæ. Frith of Forth, extremely common. Summer.

Plant easily distinguished from the preceding at first sight, by its diffuse mode of growth. *Filaments* 2–6 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.

4. C. *ciliatum*, dichotomous, purplish-red, membranaceous, capillary; branchlets remarkably forcipate at the apex; articulations pellucid, longer than broad, the joints red, swollen, whorled, with minute subulate filaments. *Lyngb.* p. 121. t. 37. *Hook.* Fl. Scot. 2. p. 85. *Conf. ciliata*, *Dillw.* t. 53. *Smith*, E. B. t. 2428., (bad).

HAB. Marine rocks. Frith of Forth, frequent. Opposite to Caroline Park. Summer.

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.

83. CALLITHAMNION. *Lyngb.*

1. C. *Plumula*, branches alternately pinnate, very slender, rose-pink; pinnæ opposite, pectinate, ramuli and tubercles secund. *Lyngb.* p. 127. *Ceramium Plumula*, *Ag.* Syn. p. 62. *Conf. Plumula*, *Dillw.* t. 50. C. *Turneri*, *Smith*, E. B. t. 1637.

HAB. Sea-shores, on various algæ. Caroline Park, Dr Richardson. Leith shore, &c. Not frequent.

Frond 1–3 inches long, branched alternately, and beautifully pinnate, the pinnæ short, their ramuli setaceous, and pointing one way. *Tubercles* shortly pedunculate, on the inner side of the pinnæ, surrounded with a pellucid limbus.—Very beautiful and tender.

2. C. *roseum*, filaments minutely capillary, much branched, and several times pinnate; branches alternate, spreading, the ramuli subulate; articulations above twice longer than their breadth; tubercles with a pellucid limbus, secund. *Lyngb.* p. 126. t. 39. *Ceramium roseum*, *Hook.* Fl. Scot. 2. p. 85. *Conf. rosea*, *Dillw.* t. 17. *Smith*, E. B. t. 966.

HAB. Sea-shores, on various large algæ. 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.

3. C. *Rothii*, filaments very short, erect, in broad tufts, branched dichotomously and alternately; articulations twice as long as they are broad. *Lyngb.* p. 129. *Ceramium Rothii*, *Hook.* Fl. Scot. 2. p. 85. *Conf. Rothii*, *Dillw.* t. 73. *Smith*, E. B. t. 1702.

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.

2. Gr. *equisetifolia*, frond red, branched; branches elongated, nearly simple, thickly set with whorled, imbricated, dichotomous filaments, with long articulations incrassated upwards. *Ag.* Syn. p. xxviii. *Hook.* Fl. Scot. 2. p. 84. *Conf. equiset. Dillw.* t. 54. *Smith*, E. B. t. 1479.

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. corallina*, *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.

2. Cl. *spongiosus*, greenish-brown, cartilaginous, branched; branches closely set, and imbricated with very short, simple, incurved filaments; articulations about as long as broad. *Ag. Hook.* Fl. Scot. 2. p. 89. *Conf. spongiosa, Dillw.* t. 42. *Smith*, E. B. t. 2427.

HAB. Rocky basins in the sea. Frith of Forth at Caroline Park, Dr Richardson. Near Newhaven, and near Kirkcaldy. Summer.

Plant 2–4 inches long, not much branched, of an olive or greenish-brown, and harsh, rather rigid substance. *Branches* set with filaments near a line long, curved upwards, and not in regular whorls. *Tubercles* obovate, pedunculate, on the filaments.

86. SPHACELLARIA. *Lyngb.*

1. Sph. *scoparia*, much branched; branches rigid, fasciculate, sub-bipinnate, crowded; pinnæ very short, alternate, subulate, adpressed; articulations about as long as broad. *Lyngb.* p. 104. t. 31. *Ceramium scoparium, Hook.* Fl. Scot. 2. p. 86. *Conf. scop. Smith*, E. B. t. 1552. *Dillw.* t. 52.

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 pinnæ about a line long. Apex of the branches somewhat sphacellate (appearing as if scorched or gangrenous). *Substance* rigid when dry.

2. Sph. *pennata*, slender, branches alternate subbipinnate, the pinnæ irregular, short, distichous, subhorizontal, alternate or opposite; articulations about as long as broad. *Lyngb.* p. 105. t. 31. *Ceramium cirrosum, Ag. Hook.* Fl. Scot. 2. p. 86. *Conf. pennata, Huds. Dillw.* t. 86. *Smith*, E. B. t. 2330. upper and lower figures.

HAB. Sea-shores, on algæ, 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 pinnæ which spring from the branches, and have acute apices. The branches can only be called pinnate (as Mr Dillwyn justly observes), towards the extremity. *Tubercles* globular, sessile.

3. Sph. *plumosa*, irregularly branched; branches pectinato-pinnate chiefly at their extremities, the pinnæ close, mostly opposite, subhorizontal, subulate, 1–2 lines long; articulations equal in length to their breadth. *Lyngb.* p. 103. t. 30. *Ceramium pennatum, Ag.* Syn. p. 68. *Conf. pennata, Smith*, E. B. t. 2330. middle figure.

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.

4. Sph. *olivacea*, minute, tufted, olive-green, branched; branches mostly simple, alternate, obtuse. Sph. *cæspitula*, *Lyngb.* p. 105. t. 32. *Conf. olivacea*, *Dillw.* Syn. p. 57. t. C. *Hook.* Fl. Scot. 2. p. 83. *Smith*, E. B. t. 2172.

HAB. Marine rocks and large algæ. Frith of Forth. Black Rocks, Leith, Messrs Arnott and Greville. Summer.

Tufts 1–2 lines high, crowded, dense, olive-green. *Filaments* very fine, erect, branched; branches seldom divided, of various lengths, sphacellate 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 peduncles.

HAB. Sea-shores. Frith of Forth, opposite Caroline Park, Dr Richardson. February.

Tufts about an inch high, erect? rather rigid. *Filaments* equal, slightly incrassated at the summit, which is sometimes but not constantly sphacellate: it is however pellucid. *Peduncles* 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.*

1. E. *littoralis*, capillary, excessively branched, bushy; branches either opposite or alternate; articulations equal in length and breadth; tubercles globose, subsessile. *Lyngb.* p. 130. t. 42. *Ceramium littorale*, *Ag. Hook.* Fl. Scot. 2. p. 86. *Conf. littoralis*, *Smith*, E. B. t. 2290. *Dillw.* t. 31.

Var. β, *ruber*, articulations equal, reddish, the joints pellucid.

Var. γ, *protensus*, articulations equal, brown; ramuli opposite and alternate, the ultimate ones fasciculate, secund, remote.

HAB. Marine rocks. Frith of Forth, extremely common. β, On old *Fucus serratus*. γ, On the wooden frame-work 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.

2. E. *siliculosus*, capillary, excessively branched; all the branches alternate; articulations longer than broad; tubercles pedunculate, lanceolato-acuminate. *Lyngb.* p. 131. t. 43. *Ceramium silicul. Ag. Hook.* Fl. Scot. 2. p. 86. *Conf. siliculosa*, *Dillw.* Syn. p. 69. t. E. *Smith*, E. B. t. 2319.

HAB. Marine rocks. Near Caroline Park. August.

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.

3. E.? *aureus*, orange; filaments minute, short, tufted, branched; branches spreading, somewhat rigid; articulations longer than broad; tubercles ovate, sessile. *Lyngb.* p. 134. t. 44. *Ceramium aureum*, *Ag. Hook.* Fl. Scot. 2. p. 86. *Conf. aurea*, *Dillw.* t. 35. *Smith*, E. B. t. 212., and *Conf. ilicicola*, t. 1639.

HAB. Damp rocks and trees, frequent. Trees about Edinburgh, Mr Walker Arnott. Rocks in the Pentland Hills.

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. CONFERVOIDEÆ. *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.

HAB. Sea-shores. Frith of Forth; Black Rocks, Leith, Messrs Arnott and Greville. April.

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, tortuous; articulations twice as long as broad.

HAB. Sea-shores; intimately attached to tufts of *Sphacellaria pennata*. 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.

HAB. In marine rocky basins. Frith of Forth, occasionally. Summer.

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.

4. C. *flaccida*, filaments greenish, simple, slender, straight, forming a short pencil-like tuft; articulations about equal in length and breadth. *Dillw.* Syn. p. 53. t. C. (and C. *curta*, t. 76.?) *Smith*, E. B. t. 2310.

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 lumbricalis*, 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.

7. C. *rupestris*, green; filaments fasciculated, much branched, virgate, rigid, straight, obtuse; branches adpressed; articulations thrice as long as broad, the joints pellucid. *Dillw.* t. 23. *Smith*, E. B. t. 1699. *Hook.* Fl. Scot. 2. p. 83.

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. 138. 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.

HAB. 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.*

14. C. *lubrica*, green; filaments very fine, much branched, lubricous; branches and branchlets approximate, subulate, articulations 2–3 times longer than broad, and marked with a green zone. *Dillw.* t. 57. *Smith*, E. B. t. 2087. *Hook.* Fl. Scot. 2. p. 83.

HAB. 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.

HAB. 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 secund, the ramuli more numerous, attenuated. *Colour* yellowish or dirty green. *Substance* rigid, fragile, especially when dry. It adheres slightly to paper.

16. C. *glomerata*, green, bushy; exceedingly branched; branches alternate, set with short, secund, fasciculated branchlets; articulations about four times longer than broad. *Dillw.* t. 13. *Smith*, E. B. t. 2192. *Hook.* Fl. Scot. 2. p. 82. C. *læte-virens*, *Dillw.* t. 48. *Smith*, E. B. t. 1854.

HAB. 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, secund, 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

longer than broad. *Dillw.* t. 1. *Smith*, E. B. t. 1553. *Hook.* Fl. Scot. 2. p. 81.

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.

18. C. *velutina*, green, forming a close velvet-like stratum on the ground; filaments branched, creeping; branches irregular, flexuose; articulations longer than broad. *Dillw.* t. 77. *Smith*, E. B. t. 1556. *Hook.* Fl. Scot. 2. p. 83.

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.

19. C. *castanea*, terrestrial; chesnut-brown, branched; filaments creeping, somewhat bipinnate, the branches alternate, divaricate, acute; articulations long. *Dillw.* t. 72. *Smith*, E. B. t. 1701.

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 chesnut 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.

20. C. *Orthotrichi*, brown, branched, parasitic; filaments very minute, short, erect, in small tufts, obtuse; articulations about equal in length and breadth. *Dillw.* t. 89. *Hook.* Fl. Scot. 2. p. 80. C. *musicola*, *Smith*, E. B. t. 1638.

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.

21. C. *ebenea*, black, branched; filaments erect, in broad tufts, short, the branches diverging; articulations very obscure, about equal in length and breadth. *Dillw.* t. 100. *Smith*, E. B. t. 702. *Hook.* Fl. Scot. 2. p. 81.

HAB. On rocks and trunks of trees, not unfrequent. Rosslyn and Auchindenny woods. The whole year.

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, lubricous, 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. genuflexa*, *Dillw. Smith*, E. B. t. 1914.

HAB. Ditches and stagnant pools. Small pools on the Pentland Hills. April.

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, lubricous; 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.

HAB. Ponds and ditches, frequent. Pond in the new Botanic Garden (never to be eradicated). Summer.

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. *quininum*, filaments simple, lubricous; 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 lubricous, and adhere to paper; afterwards, they lose their lubricity, and are fragile, scarcely adhering to paper.

4. Z. *bipunctatum*, filaments simple, lubricous; 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.

HAB. Ponds and ditches. Pentland Hills, Messrs Arnott and Greville. April.

Plant floating in entangled masses on the surface of the water, lubricous, yellowish-green. *Articulations* varying in length, containing two distinct masses of roundish granules; the joints obscure. It adheres to paper.

90. FRAGILLARIA*. *Lyngb.*

1. F. *hyemalis*, filaments simple, plane, gelatinous, very fragile; articulations shorter than broad, mostly pellucid, separating at the joints. *Lyngb.* p. 185. t. 63. *Conf. hyemalis*, *Ag.* Syn. p. 78.

HAB. Streams and rivulets. Pentland Hills. April.

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.*

1. Dr. *glomerata*, gelatinous; filaments much branched; branches set with spreading fasciculi of multifid branchlets, form of the fasciculi ovate, obtuse; articulations nearly twice as long as broad. *Ag. Lyngb.* p. 189. t. 64. *Hook.* Fl. Scot. 2. p. 77. *Conf. mutabilis*, E. B. t. 1746.

HAB. Lakes and streamlets, not unfrequent. Ditches in the Meadows, Edinburgh. Spring and summer.

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. CHÆTOPHOROIDEÆ. *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.

HAB. Streams and rivulets, attached to stones and aquatic plants. Pentland Hills. February.

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* 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*, *arcuatum*, and *obliquatum*, (formerly described as *Confervæ*). *Fragillaria striatula* and *pectinalis* (*Confervæ* of authors), I consider in the same light. *Conf. stipitata*, *Bidulphiana* and *tæniæformis* 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.

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.*

2. Ch. *marina*, olive green, globose, subcoriaceous, hollow; filaments densely arranged in the substance of the plant, branched dichotomously; branches fastigiate and clavate at the apex. *Grev.* Crypt. Fl. t. 53. *Nostoc marinum*, *Ag.* Syn. p. 133. *Rivularia tuberiformis*, *Smith*, E. B. t. 1956.

HAB. Sea-shores, attached to rocks, corallines and various Algæ. 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, subopake bodies, which are not yet understood.

** *Marine.*

2. L. *atra*, blackish green within, hemispherical, solid, very firm; filaments simple, straight, acuminate, laciniate at the apex; articulations obscure. *Lyngb.* p. 195. t. 67. *Rivularia atra*, *Smith*, E. B. t. 1798. *Hook.* Fl. Scot. 2. p. 75.

HAB. Sea-shores, on various Algæ 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;

filaments simple, curved, moniliform. *Hook.* Fl. Scot. 2. p. 74. *Tremella Nostoc, Smith*, E. B. t. 461.

HAB. Pastures, gravel-walks, &c., in moist weather. About Edinburgh, occasionally.

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.

2. N. *verrucosum*, subglobose, coriaceo-carnose, hollow, plicate; filaments simple, curved, moniliform, imbedded in a watery, gelatinous substance. *Ag.* Syn. p. 132. *Hook.* Fl. Scot. 2. p. 74.

HAB. In subalpine streamlets. Pentland Hills, most abundantly. April. Messrs Arnott and Greville.

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, opake, 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.)

HAB. On the ground in shady and heathy places. Pentland Hills. Autumn.

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 envelloping 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.

3. P. *rosea*, minute, roundish, soft, rose-coloured, containing extremely minute sporules. *Grev.* Crypt. Fl. t. 51. *Lyngb.* p. 207. *Tubercularia rosea, Pers.* Syn. Fung. p. 114.

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. LICHENES. *Hoffm.*

96. SPILOMA. *Ach.*

1. S. *tumidulum*, crust subcartilaginous, whitish; fructification crowded, tumid, irregularly oblong, rough, reddish, becoming at length brownish black and subpruinose. *Ach.* Syn. Lich. p. 1. *Smith*, E. B. t. 2151. *Hook.* Fl. Scot. 2. p. 35.

HAB. On the bark of trees. Rosslyn, by the river side, Maughan. Swanston 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).*

1. L. *atro-alba*, crust spreading, very thin, cracked, black, with scattered, whitish, swelling areolæ; fructification plano-convex, black internally as well as externally. *Ach.* Syn. Lich. p. 11. *Hook.* Fl. Scot. 2. p. 36.

HAB. Upon rocks. Orock Hill.

It covers the rocks, says Acharius, in the same manner as L. *atro-virens*. The white *areolæ* 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.

2. L. *fusco-atra*, crust very thin, black, cracked, areolæ chesnut brown, plane, marginated, shining, scattered; fructification somewhat convex, with a black border, white within. *Ach.* Syn. Lich. p. 12. *Hook.* Fl. Scot. 2. p. 37. *Lichen dendriticus*, *Smith*, E. B. t. 1734.

HAB. On rocks. Pentland Hills, Dr Walker.

The fructification of this species is liable to change its character in some degree from age; the areolæ becoming thicker, and elevating it or rising above it. Acharius removed it from the *Lecideæ* of his Method. Lich. to the *Lecanoræ*, in his Lich. Universal, but found it necessary to restore it to the *Lecideæ* again in his Syn. Lichenum.

3. L. *petræa*, crust thin, orbicular, slightly cracked, subpulverulent, white: fructification innate, thick, prominent, subconcentrical, black, with a tumid raised border. *Ach.* Syn. Lich. p. 15. *Smith*, E. B. t. 246.

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. *confluens*, crust tartareous, somewhat spreading, cracked and areolated, subeven, greyish-brown; fructification sessile, at length irregular, convex, subglobose, confluent, black, bor-

derless, within having a thin grey stratum under the disk. *Ach.* Syn. Lich. p. 16. *Smith*, E. B. t. 1964. *Hook.* Fl. Scot. 2. p. 37.

HAB. On rocks and stones. Pentland Hills, Sir James Edward Smith. Braid Hill.

The crust varies much in colour, from grey or a subglaucous hue to a ferruginous brown. Both the *areolæ* and the *fructification* become irregular in age. In a young state the fructification is regular, plane, and decidedly bordered.

5. L. *parasema*, crust thin, submembranaceous, whitish or greyish, bounded by a black line, at length spreading, and subgranulated; fructification rather plane, sessile, bordered, black, blackish also within. *Ach.* Syn. Lich. p. 17. *Smith*, E. B. t. 1450. *Hook.* Fl. Scot. 2. p. 37.

HAB. On the bark of trees, common. Swanston wood. Slateford, Granton wood, &c.

A variable species, yet I trust sufficiently marked by the Acharian character. The fructification is generally flattish 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.

6. L. *sanguinaria*, crust somewhat rugose and warty, greyish white; fructification at length convex, hemispherical, subtuberculose, black, within of a horny black substance, having an inferior blood coloured, pulverulent stratum. *Ach.* Syn. Lich. p. 19. *Smith*, E. B. t. 155. *Hook.* Fl. Scot. 2. p. 37.

HAB. On rocks and trunks of trees. At Balmuto. Pentland Hills.

The crust varies in colour from whitish to greenish, is at first subgranulated, in old age rugoso-squamose, and extremely unequal.

7. L. *atro-virens*, crust spreading, thin, black, with scattered, nearly plane, subcontiguous areolæ, of a bright yellow; fructification plano-concave, black, within of the same colour. *Ach.* Syn. Lich. p. 21. *Hook.* Fl. Scot. 2. p. 37.

β. *geographica*, areolæ 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 areolæ varies from greenish yellow to a pale sulphur colour. This species is so well marked, that it needs no farther description.

8. L. *Œderi*, crust areolated and granulated, subpulverulent, of a colour between ochraceous and ferruginous; fructification minute, elevated, with a tumid border and black depressed disk, within of the same colour. *Ach.* Syn. Lich. p. 22. *Smith*, E. B. t. 1117. *Hook.* Fl. Scot. 2. p. 38.

HAB. On rocks and stones. King's Park, Edinburgh, Maughan. Pentland Hills.

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.

9. L. *alba*, crust of a subdeterminate form, membranaceous, white, slightly cracked, scattered with a greyish or greenish white aggregated powder; fructification minute, adpressed, plane, black. *Ach.* Syn. Lich. p. 24. *Smith*, E. B. t. 1349. *Hook.* Fl. Scot. 2. p. 38.

HAB. On trees and rocks. Pentland Hills, Maughan. Braid Hermitage.

The *fructification* is extremely rare, which renders it very liable to be mistaken for a Lepraria by the student.

** *Fructification black, pruinose.*

10. L. *abietina*, crust spreading, very thin, smooth, glaucous; fructification subsessile, plane, black, with a grey bloom, the border raised and swelling. *Ach.* Syn. Lich. p. 30.

HAB. On the trunks of *Pinus Abies*. Neighbourhood of Edinburgh, Maughan.

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.

12. L. *incana*, crust spreading, leproso-farinose, soft, uneven, hoary, glaucous, or slightly greenish; fructification scattered, sessile, brownish, the border pale and entire. *Ach.* Syn. Lich. p. 36. *Smith*, E. B. t. 1685. *Hook.* Fl. Scot. 2. p. 38.

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.

13. L. *viridescens*, crust thin, granulated, somewhat farinose, green or greenish brown; fructification convex, rugose, irregular, confluent, blackish brown. *Ach.* Syn. Lich. p. 36.

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.

14. L. *cæsio-rufa*, crust cracked and areolated, rugose, darkish grey; fructification plane, brownish red, with sometimes a crenulate border, becoming at length convex, less bordered, dark, or blackish red. *Ach.* Syn. Lich. p. 44. *Hook.* Fl. Scot. 2. p. 39. *Lichen ferrugineus*, *Smith*, E. B. t. 1650.

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.

15. L. *icmadophila*, crust leprose, uneven, subgranulated, greenish white; fructification subsessile, plane, flesh-colour, at length flexuose, the disk rugose, the border narrow, scarcely visible. *Ach.* Syn. Lich. p. 45. *Hook.* Fl. Scot. 2. p. 39. *Lichen ericetorum*, *Smith*, E. B. t. 372.

HAB. Heathy places on the ground. Heaths near Balmuto. Pentland Hills.

A species so well marked as not to be mistaken for any other.

16. L. *marmorea*, crust thin, greyish white; fructification subglobose, at length urceolate, white, the disk flesh-colour, the border tumid, entire. *Ach.* Syn. Lich. p. 46. *Smith*, E. B. t. 739. *Hook.* Fl. Scot. 2. p. 40.

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.

17. L. *Ehrhartiana*, crust cartilaginous, cracked, rugoso-plicate and granulated, white or slightly greenish; fructification subsessile, plane, at length somewhat convex, flexuose, shapeless, conglomerated, pale yellowish. *Ach.* Syn. Lich. p. 47. *Hook.* Fl. Scot. 2. p. 40. *Lichen Ehrhartianus*, *Smith*, E. B. t. 1136.

β. *polytropa*, crust subtartareous, 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.

HAB. On rocks. Pentland Hills, Maughan. North Queensferry, Messrs Hooker and D. Turner.

Crust sometimes cohering, cracked, sometimes subpulverulent, at others almost absent. *Fructification* in old age becoming angular from the apothecia pressing against each other.

18. L. *lucida*, crust leprose, flocculoso-pulverulent, lemon-coloured; fructification plano-convex, almost borderless, pale yellow. *Ach.* Syn. Lich. p. 48. *Smith*, E. B. t. 1550. *Hook.* Fl. Scot. 2. p. 40.

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. CALICIUM. *Ach.*

1. C. *claviculare*, crust effused, greyish, somewhat pulverulent; fructification subglobose, at length flattened, greyish black, with a cylindrical, thickish, black peduncle. *Ach.* Syn. Lich. p. 57.

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.

2. C. *sphærocephalum*, crust greyish, very thin, smooth, fructification subglobose, disk brownish; the border greyish; peduncle black, filiform. *Ach.* Syn. Lich. p. 57. *Hook.* Fl. Scot. 2. p. 41. *Lichen sphæroc. Smith*, E. B. t. 414.

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.

3. C. *chrysocephalum*, crust lemon-yellow, granulated and conglomerated; fructification subturbinate, disk brown, convex, the border yellow and pulverulent; peduncle filiform, blackish and shining at the base. *Ach.* Syn. Lich. p. 60. *Smith*, E. B. t. 2501.

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-

vex and contorted. *Ach.* Syn. Lich. p. 66. *Smith*, E. B. t. 2483. *Hook.* Fl. Scot. 2. p. 42.

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.*

1. E. *Hedwigii*, plant subcartilaginous, roundish, or somewhat angular, lobed, of an olive green; beneath, pale at the margin, the rest blackish and fibrillose; orifice of the fructification subprominent, dark brown. *Ach.* Syn. Lich. p. 99. *Lichen trapeziformis*, *Smith*, E. B. t. 595.

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 subcrenate at the margin. *Colour* usually olive; but green, brown, and even nearly black specimens occur.

2. E. *miniatum*, plant thick, cartilaginous, foliaceous, round, peltate, greyish, spreading, flexuoso-plicate, smooth beneath, at length rugose and fulvous; orifices minute, rarely subprominent, brownish. *Ach.* Syn. Lich. p. 101. *Smith*, E. B. t. 593. *Hook.* Fl. Scot. 2. p. 44.

HAB. On rocks. In the King's Park, Edinburgh, Lightfoot. Castle Rock, Maughan. Balmuto. Pentland Hills.

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.

3. E. *complicatum*, plant coriaceo-cartilaginous, lobed, grey, brownish black underneath, lobes somewhat erect, rounded, plicato-convolute; orifices crowded, convex, black. *Ach.* Syn. p. 102. *Hook.* Fl. Scot. 2. p. 44. *Lichen miniatus*, β. *amphibus*, *Smith*, E. B. t. 593. f. 2.

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.

4. E. *Weberi*, plant cartilaginous or subcoriaceous, foliaceous, lobed, greyish brown or olive; fawn-colour or brownish beneath, smooth on both sides; lobes laciniate, waved, crisped, crowded, irregular in form; orifices somewhat convex, black. *Ach.* Syn. Lich. p. 103. *Hook.* Fl. Scot. 2. p. 45. *Lichen aquaticus*, *Smith*, E. B. t. 594.

HAB. On rocks and stones, by the sides of, or in streams of water. Auchindenny, rare.

Very much resembling E. *complicatum*. *Colour* when moist, green; when dry it is sometimes blackish brown, never glaucous; underneath it is sometimes quite black.

101. THELOTREMA. *Ach.*

1. T. *lepadinum*, crust smooth, whitish; warts of the fructification smooth, subconical; the margin of the aperture thin, simple, subinflexed and contracted, covered at the base with a membrane which bursts. *Ach.* Syn. Lich. p. 115. *Hook.* Fl. Scot. 2. p. 45. *Lichen inclusus*, *Smith*, E. B. t. 678.

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. VARIOLARIA. *Pers.*

1. V. *globulifera*, crust subcartilaginous, greyish, uneven, with granules and soredia scattered in an irregular manner; warts of the fructification subglobose, smooth, at length depressed above and sorediferous, and containing a concave nucleus. *Turn.* in Linn. Trans. vol. ix. p. 139. t. 10. f. 2. *Ach.* Syn. Lich. p. 1130. *Smith*, E. B. t. 2008.

HAB. Trees and rocks. Braid Hermitage, Maughan.

Soredia frequent, convex and white. *Warts* nearly solid, large, subglobose, pulverulent on the top, and containing within, a large concave fructiferous stratum.

2. V. *amara*, crust rugose, cracked, uneven, subpulverulent, white, becoming greyish; warts of the fructification adpressed, plano-concave, bordered, bearing soredia (or collections of naked sporules) of the same colour. *Ach.* Syn. Lich. p. 181. *Hook.* Fl. Scot. 2. p. 46. *Lich. fagineus*, *Smith*, E. B. t. 1713.

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.

3. V. *lactea*, crust tartareus, of a determinate form, tessellated, smooth, very white, somewhat zoned and crenato-lobate; warts of the fructification crowded, bordered, pure white, pulverulent. *Ach.* Syn. Lich. p. 132. *Smith*, E. B. t. 2410. *Hook.* Fl. Scot. 2. p. 46.

HAB. On rocks and stones. Pentland Hills, not rare.

A distinct species, having somewhat the habit of *Isidium corallinum*.

103. URCEOLARIA. *Ach.*

1. U. *Acharii* crust of a subdecided form, smooth, crossed by very narrow cracks, pale brick colour; disk of the fructifi-

cation red, the border tumid. *Ach.* Syn. Lich. p. 137. *Smith*, E. B. t. 1087. *Hook.* Fl. Scot. 2. p. 47.

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.

HAB. On rocks. King's Park, Edinburgh. Coast of Fife, between Pettycur and Kirkaldy.

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.*

1. L. *atra*, crust of a subdistinct form, cracked, granulated, or warty greyish white; disk of the fructification plane, at length swelling, black, the border raised, free at length, waved and crenulate. *Ach.* Syn. Lich. p. 146. *Smith*, E. B. t. 949. *Hook.* Fl. Scot. 2. p. 47.

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.

HAB. Rocks. On stones in walls about Edinburgh, Maughan.

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.

3. L. *subfusca*, crust cartilaginous, smooth, at length granulated, uneven, greyish white; disk of the fructification planoconvex, brownish or black; the border tumid, entire, at length flexuose and crenate. *Ach.* Syn. Lich. p. 157. *Hook.* Fl. Scot. 2. p. 47.

HAB. On trees, rocks, old walls, &c. Braid, Rosslyn, Auchindenny, 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.*

4. L. *perella*, crust cracked, plicate or warty, very white; fructification thick, crowded, often irregular in form from mutual pressure, the disk somewhat concave, the border turgid, very entire, nearly of the same colour as the crust. *Ach.* Syn. Lich. p. 169. *Smith*, E. B. t. 726. *Hook.* Fl. Scot. 2. p. 48.

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 areolæ very turgid and prominent; the border of the fructification remarkably thick.

5. L. *tartarea*, crust tartareous, granulated in a clustered manner, greyish white; fructification scattered, the disk plano-convex, rugulose, pale flesh-colour, the border inflexed, at length waved. *Ach.* Syn. Lich. p. 172. *Smith*, E. B. t. 156. *Hook.* Fl. Scot. 2. p. 49.

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.

6. L. *vitellina*, crust granulated, deep yellow; fructification crowded, the disk plane, of the same colour as the crust, at length somewhat convex, of a deeper colour with a bloom; the border raised, narrow, at length flexuose and pulverulent. *Ach.* Syn. Lich. p. 174. *Smith*, E. B. t. 1792. *Hook.* Fl. Scot. 2. p. 49.

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.*

7. L. *ventosa*, crust tessellated, pale, areolæ convex, plicate or somewhat warty; fructification adpressed, at length irregular, the disk plane or slightly tumid, brownish red, and rising above the narrow and entire border. *Ach.* Syn. Lich. p. 159. *Smith*, E. B. t. 906. *Hook.* Fl. Scot. 2. p. 18.

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.

8. L. *Hæmatomma*, crust tartareous, subgranulated and slightly cracked, pulverulent, subsulphureous; fructification innate, scattered and confluent; disk bright red, sub-bordered. *Ach.* Syn. Lich. p. 178. *Smith*, E. B. t. 486. *Hook.* Fl. Scot. 2. p. 49.

HAB. On rocks and stones. Salisbury Craigs, Sir J. E. Smith. Rosslyn woods, Maughan. Pentland Hills.

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.*

9. L. *murorum*, crust plicato-rugose, cracked, bright yellow, the surface pulverulent and pruinose, radiating from the centre; segments linear, convex, jagged; fructification crowded, the disk at length convex, and of a deeper colour, the border entire, waved. *Ach.* Syn. Lich. p. 181., E. B. t. 2157. *Hook.* Fl. Scot. 2. p. 50.

HAB. On rocks, stones and walls. Walls about Edinburgh. King's Park, &c.

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.

10. L. *saxicola*, crust subimbricated, scaly, somewhat rugose, uneven, pallid green, radiated and lobed in the circumference; fructification extremely crowded, the disk plane, yellowish brown or subochraceous, with a border at length crenate and waved. *Ach.* Syn. Lich. p. 180. *Smith*, E. B. t. 1695.

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.

11. L. *elegans*, crust subimbricated, plicato-rugose, of a yellow orange-colour, surface naked, lobes linear, somewhat divided, flexuose, convex, radiated; disk of the fructification rather concave, nearly the same colour as the crust; border entire, subinflexed. *Ach.* Syn. Lich. p. 182. *Smith*, E .B. t. 2181. *Hook.* Fl. Scot. 2. p. 56.

HAB. On rocks and stone-walls. About Edinburgh. In the King's Park.

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.

12. L. *galactina*, crust subimbricated, rugulose, whitish; lobed and crenate at the circumference; fructification crowded, angular, the disk plane, brownish flesh-colour, pruinose, with a raised, and at length crenate, flexuose border. *Ach.* Syn. Lich. p. 187.

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.*

13. L. *crassa*, crust scaly, pale or brownish green, lobes imbricated, inciso-crenate, waved, irregular; disk of the fructification plane or slightly swelling, brownish orange, in age much darker, the border narrow, entire, at length vanishing. *Ach.* Syn. Lich. p. 190. *Smith*, E. B. t. 1893. *Hook.* Fl. Scot. 2. p. 51.

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.

14. L. *candelaria*, crust scaly, yellow, lobes crowded, lacerato-laciniate, imbricate, with the margins pulverulent or granulate; fructification rarely plane, of the same colour as the crust, with an elevated entire border. *Ach.* Syn. Lich. p. 192. *Smith*, E. B. t. 1794. *Hook.* Fl. Scot. 2. p. 51.

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.

15. L. *Hypnorum*, crust scaly, dark greenish brown, lobes minute, roundish, irregular in form, with their edges granulated and crenulate; fructification submembranaceous, the disk concave, at length plane, dilated, reddish brown, border raised, inflexed, crenate. *Ach.* Syn. Lich. p. 193. *Smith*, E. B. t. 1740. *Hook.* Fl. Scot. 2. p. 51.

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.

16. L. *brunnea*, crust imbricated, lobes somewhat granulated, greyish brown; fructification innate in the crust, very crowded and irregular in its form, disk rather convex, reddish brown, the border raised, crenulate, persistent. *Ach.* Syn. Lich. p. 193. *Smith*, E. B. t. 1246. *Hook.* Fl. Scot. 2. p. 51.

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.)

1. P. *glomulifera*, plant cartilaginous, rigid, orbicular, livid, smooth, bearing dark green, tufted, stipitate excrescences, tomentose beneath; lobes waved and laciniate; fructification reddish brown, border rugose. *Ach.* Syn. Lich. p. 195. *Smith*, E. B. t. 293. *Hook.* Fl. Scot. 2. p. 52.

HAB. Old trees. Pentland Hills, Maughan. Humby woods.

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.

2. P. *caparata*, plant orbicular, pale greenish yellow, rugose, at length granular, beneath dark and hispid; lobes plicate, waved, the segments entire, rounded; fructification scattered, with an entire, incurved, and at length pulverulent, border. *Ach.* Syn. Lich. p. 190. *Smith*, E. B. t. 654. *Hook.* Fl. Scot. 2. p. 52.

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 rugæ, generally more or less granular or pulverulent; beneath it is thickly set with short dark fibres.

3. P. *perlata*, orbicular, pale glaucous, or greenish white, naked, beneath blackish brown, slightly villous; lobes rounded, cut, plane, margin subplicate, entire; fructification reddish, the border narrow, very entire. *Ach.* Syn. Lich. p. 197 *Smith*, E. B. t. 341. *Hook.* Fl. Scot. 2. p. 52.

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.

4. P. *herbacea*, orbicular, membranaceous, naked, pale beneath, with a brownish down; lobes waved, cut, roundish-spreading, subcrenate; fructification reddish, with a rugoso-crenate, inflexed border. *Ach.* Syn. Lich. p. 198. *Hook* Fl. Scot. 2. p. 52. *Lichen læte-virens*, *Smith*, E. B. t. 294.

HAB. 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.

5. P. *olivacea*, orbicular, dark olive, rugulose, rough with raised points, paler, and brownish beneath, and subfibrillose; lobes radiating, adpressed, plane, dilated, rounded, crenate; fructification nearly plane, similar in colour to the frond, the border crenulate. *Ach.* Syn. Lich. p. 200. *Smith*, E. B. t. 2180. *Hook.* Fl. Scot. 2. p. 52.

HAB. 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 pulverulent appearance.

6. P. *parietina*, orbicular, bright yellow, paler beneath, and subfibrillose; lobes radiating, adpressed, plane, dilated at the extremity, rounded, crenate, crisped; fructification of the same colour, with a very entire border. *Ach.* Syn. Lich. p. 200. *Smith*, E. B. t. 194. *Hook.* Fl. Scot. 2. p. 52.

HAB. On rocks, walls and trees, very abundant.

A very distinct species, and conspicuous from its bright yellow colour.

7. P. *omphalodes*, orbicular, dark brown, or even nearly black, shining, dotted with black, rough with black fibres beneath; lobes waved, multifid, linear, plane, subtruncate, crenate in the circumference; fructification brown, with a subcrenate border. *Ach.* Syn. Lich. p. 203. *Smith*, E. B. t. 604. *Hook.* Fl. Scot. 2. p. 53.

HAB. 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-

dish brown, with a crenulate border. *Ach.* Syn. Lich. p. 203. *Smith*, E. B. t. 603. *Hook.* Fl. Scot. 2. p. 53.

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.

9. P. *aquila*, orbicular, reddish brown, paler beneath, bearing black fibres; lobes multipartite, sublinear, convex, dilated towards the circumference, where they are nearly plane and crenate; fructification dark brown, with a crenulate border. *Ach.* Syn. Lich. p. 205. *Smith*, E. B. t. 982. *Hook.* Fl. Scot. 2. p. 54.

HAB. On rocks, particularly near the sea. King's Park, Edinburgh, Lightfoot. Caroline Park; Braid Hermitage and Pentland Hills, Maughan. Coast of Fife, between Burntisland and Kirkaldy. Near Granton, and on Cramond Island.

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.

10. P. *recurva*, stellate, pale, rather greenish, bearing soredia (or collections of naked sporules), furnished beneath with a spongy mass of black fibres; lobes divided at the circumference into a great number of very narrow, convex, and almost cylindrical segments; fructification reddish brown, with a subentire border. *Ach.* Syn. Lich. p. 206. *Hook.* Fl. Scot. 2. p. 54. *Lichen incurvus*, *Smith*, E. B. t. 1375.

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.

11. P. *conspersa*, orbicular, pale greenish or greyish yellow, smooth, dotted with black, beneath brown and fibrillose; lobes waved, somewhat divided, rounded, plane, crenate; fructification confined to the centre, reddish brown, with a subentire border. *Ach.* Syn. Lich. p. 209. *Smith*, E. B. t. 2097. *Hook.* Fl. Scot. 2. p. 55.

HAB. On rocks and stones. Corstorphine Hill; Craigleith, Maughan. Pentland Hills. Coast of Fife, above Burntisland.

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.

12. P. *pulverulenta*, stellate, glaucous green, pruinose, dark beneath, and tomentoso-hispid; lobes linear, multifid, plane at the circumference and adpressed, waved, retuse at the extremity; fructification dark and glaucous, with a flexuose and entire border. *Ach.* Syn. Lich. p. 214. *Smith*, E. B. t. 2063. *Hook.* Fl. Scot. 2. p. 55.

HAB. On trunks of trees, common. Braid Hermitage. Avenue leading to Blackford House. Swanston wood, &c.

Plant membranaceous, cracking irregularly in the centre when old. *Lobes* radiating, and continued almost from the centre, linear, multifid, pruinose, closely adpressed; the fibrillæ beneath straight, black, sharp and hispid. When this lichen is moistened, the bloom disappears, but returns on drying.

13. P. *stellaris*, stellate, at length rugoso-plicate, greenish ash-colour, white beneath with greyish fibres; lobes sublinear, somewhat convex, cut, multifid; fructification dark and glaucous, with an entire, and at length flexuose, crenate border. *Ach.* Syn. Lich. p. 216. *Smith*, E. B. t. 1697. *Hook.* Fl. Scot. 2. p. 55.

HAB. Trunks and branches of trees, common. Swanston wood, and elsewhere about Edinburgh, abundant.

An elegant lichen, submembranaceous, 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.

14. P. *cæsia*, stellate, greyish white and glaucous, sorediferous, ash-coloured beneath, with black fibres; segments linear, cut, multifid, convex, but plane at the extremities; fructification subconcave, black, with a subinflexed border. *Ach.* Syn. Lich. p. 216. *Smith*, E. B. t. 1052.

HAB. Rocks, stones, and trunks of trees. King's Park, Maughan.

Frond subcrustaceous, membranaceous, orbicular; segments pinnatifid, subimbricated, 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 ciliæ at the margin, which is generally more or less pulverulent.

** *Lobes inflated at their extremities.*

16. P. *physodes*, substellate, glaucous white; lobes imbricated, sinuato-multifid, convex, glabrous, inflated at the extremity and ascending, beneath naked, blackish-brown; fructification reddish, or sometimes of an orange flesh-colour, with an entire border. *Ach.* Syn. Lich. p. 218. *Smith*, E. B. t. 126. *Hook.* Fl. Scot. 2. p. 56.

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.*

1. B. *ciliaris*, greyish green; lobes or laciniæ linear, branched, attenuated, ciliate at the extremities, whitish beneath and channelled; fructification subterminal, the disk concave, at length plane, dark, fuscous, pruinose, with a crenate and fimbriate border. *Ach.* Syn. Lich. p. 221. *Smith*, E. B. t. 1352. *Hook.* Fl. Scot. 2. p. 56.

HAB. On trees, sometimes on rocks. Auchindenny and Rosslyn woods. Dalkeith; about Kirkliston.

Lobes or laciniæ 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 laciniæ 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.

HAB. On trees and rocks. Swanston wood. Common on stone-walls on the Pentland Hills.

Circular and stellate, imbricated. The entire border of the fructification, much smaller in size, and (usually) pale coloured fibrillæ at the ends of the laciniæ, serve to distinguish this lichen from any other native species.

3. B. *furfuracea*, greyish or brownish green, farinaceous, laciniæ branched, irregularly linear, attenuated, beneath channelled, rugose, naked, and purplish black; fructification submarginal, cyathiform, the disk reddish, with a thin and inflexed border. *Ach.* Syn. Lich. p. 222. *Smith*, E. B. t. 984. *Hook. Hook.* Fl. Scot. 2. p. 56.

HAB. On trunks of trees. Swanston wood.

Plant membranaceous. *Laciniæ* 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.

107. CETRARIA. *Ach.*

1. C. *glauca*, glaucous, somewhat shining, sinuate and lobed, beneath blackish brown; lobes cut, lacerate, complicate, curled, ascending; fructification raised, reddish-brown, with a rugulose border. *Ach.* Syn. Lich. p. 227. *Smith*, E. B. t. 1066. *Hook.* Fl. Scot. 2. p. 57.

HAB. Trunks of old trees and rocks. Pentland Hills, Maughan.

Plant membranaceous, very complicate, curled, and laciniate, whitish glaucous or greenish; *laciniæ* broad or narrow, with sometimes a granular surface. *Fructification* not conspicuous, and of rare occurrence.

2. C. *islandica*, olive-brown, bright reddish or pale at the base, whitish beneath; lobes suberect, irregularly linear, multifid, canaliculate, dentato-ciliate, the fertile ones dilated; fructification adpressed, plane, of the same colour as the frond, with a raised entire border. *Ach.* Syn. Lich. p. 229. *Smith*, E. B. t. 1330. *Hook.* Fl. Scot. 2. p. 58.

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.

108. STICTA. *Schreb.*

1. S. *pulmonaria*, olive green, reticulated, with hollows or pits between the reticulations, villous beneath, with pale and naked eminences; lobes sinuate, divided, truncate; fructification submarginal, the disk reddish, border subrugose. *Ach.* Syn. Lich. p. 233. *Smith*, E. B. t. 572. *Hook.* Fl. Scot. 2. p. 58.

HAB. On trunks of old trees. Pentland Hills, Maughan. Humby wood.

Upper surface nearly smooth, somewhat shining, lacunose; beneath papulose, with little eminences, which are whitish, and the interstices villous and fuscous.

2. S. *scrobiculata*, suborbicular, blueish or brownish grey, broad, smooth, scrobiculate, greyish beneath, and downy, with naked white spots; lobes roundish; disk of the fructification reddish, with a subcrenate border. *Ach.* Syn. Lich. p. 234. *Smith*, E. B. t. 497. *Hook.* Fl. Scot. 2. p. 59.

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*

surface impressed with scrobicular lacunæ or hollows, and bearing numerous small grey soredia. *Fructification* small and very rare.

3. S. *limbata*, orbicular, glaucous brown, rounded, and somewhat lobed, greyish and pulverulent at the margin, villous beneath; disk of the fructification ferruginous. *Ach.* Syn. Lich. p. 236. *Smith*, E. B. t. 1104. *Hook.* Fl. Scot. 2. p. 59.

HAB. Trunks of trees and rocks among moss. Braid Hermitage, Sir J. E. Smith. Moist rocks near Balmuto.

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.

109. PELTIDEA. *Ach.*

1. P. *venosa*, small, roundish, green, grey beneath, with branched, excurrent, fuscous veins; lobes rounded, divided, subentire; fructification marginal, plane, round, somewhat tumid, subcrenulate, obscure or reddish-brown. *Ach.* Syn. Lich. p. 237. *Smith*, E. B. t. 887. *Hook.* Fl. Scot. 2. p. 59.

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.

2. *aphthosa*, green, smooth, with small scattered brown warts, reticulated beneath with black veins; fertile lobes longer than the barren ones, and somewhat dilated at the extremity; fructification large, red, ascending, with a sublacerate border. *Ach.* Syn. Lich. p. 238. *Smith*, E. B. t. 1119. *Hook.* Fl. Scot. 2. p. 60.

HAB. On the ground, among moist rocks and old trees. Pentland Hills, Mr Yalden. Near Habbie's How.

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.

3. P. *canina*, greenish ash-colour, reticulated beneath with grey-fuscous veins; fertile lobes longer than the barren ones, with the edges reflexed; fructification terminal, suberect, revolute, red, the border thin, subcrenulate. *Ach.* Syn. Lich. p. 239. *Smith*, E. B. t. 2299. *Hook.* Fl. Scot. 2. p. 60.

β. *rufescens*, polyphyllous, concave, reddish-brown, pale reddish-white beneath, with obsolete veins; lobes rounded, incurved, fertile lobules short; fructification terminal, erect, roundish, dark brown, with a nearly entire border. *Hook.* Fl. Scot. 2. p. 60. P. *canina*. β.? *(Hook)*. *Ach.* Syn. Lich. p. 239. *Lichen rufescens*, E. B. t. 2300.

HAB. On the ground, hedge-banks, roofs of old thatched cottages, &c.

common. β. 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 fibrillæ. Underneath it is very white and beautifully reticulated with downy veins. *Fertile lobes* suberect, and reflexed, thus rendering them tubuloso-canaliculate. *Colour* varying from red to brown, or even black; the margin very thin, subentire or crenulate.

4. P. *polydactyla*, glaucous green, naked, glabrous, reticulated beneath with fuscous veins; the fertile lobules very numerous, elongated with terminal fructification, of an obscure reddish-brown colour; margin revolute. *Ach.* Syn. Lich. p. 240. *Hook.* Fl. Scot. 2. p. 60.

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.*

1. E. *prunastri*, white or palish, branches or lacinciæ dichotomous, multifid, somewhat ascending, linear, attenuated, plane, rugose, slightly pitted; beneath, very white and subcanaliculate; disk of the fructification light reddish brown. *Ach.* Syn. Lich. p. 245. *Hook.* Fl. Scot. 2. p. 61. *Smith*, E. B. t. 859. *Lichen stictoceros*, E. B. t. 1353.

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.)

1. C. *papillaria*, subcrustaceous, uniform, granulated, greyish; podetia ventricose, glabrous, white, simple or branched, the branches very short, confluent and subfastigiate; fructification minute, reddish-brown. *Ach.* Syn. Lich. p. 248. *Smith*, E. B. t. 907.

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.*

2. C. *alcicornis*, foliaceous, pale glaucous or greenish, segments subpalmate, ascending, subdentate, obtuse, inflexed, pilose at the margin; podetia elongato-turbinate, all cup-bearing, smooth, cups regularly crenate, and becoming at length foliaceous and proliferous; fructification brown. *Ach.* Syn. Lich. p. 250. *Smith*, E. B. t. 1392. *Hook.* Fl. Scot. 2. p. 62.

HAB. Heaths, rocks. Dunearn. Pentland Hills.

Plant cartilaginous, thickish, variously laciniate; laciniæ sublinear, obscurely dentato-crenate at the margin, generally split at the extremity and inflexed.

3. C. *cervicornis*, foliaceous, glaucous green, segments erect, multifid, narrow, subdentate; podetia cylindrical, short, glabrous, brownish, at length black, all cup-bearing; cups small, entire, somewhat plane, proliferous from the centre; fructification marginal, sessile, brownish-black. *Ach.* Syn. Lich. p. 251. *Smith*, E. B. t. 2574. *Hook.* Fl. Scot. 2. p. 62.

HAB. On the ground, in heathy and rocky places. Pentland Hills, Sir J. E. Smith. Dunearn.

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.

4. C. *pyxidata*, foliaceous; segments crenulate, ascending; podetia turbinate, cupbearing, glabrous, at length granular, rough, greenish grey; cups regular, the margin proliferous; fructification brown. *Ach.* Syn. Lich. p. 252. *Smith*, E. B. t. 1393. *Hook.* Fl. Scot. 2. p. 62.

HAB. Heaths. Old walls, &c. Pentland Hills. About Colinton.

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.

5. C. *fimbriata*, foliaceous, segments small, crenate; podetia elongated, cylindrical, cupbearing occasionally, subulate, very slender, pulverulent, white; cups cyathiform, regular, the margin very entire and crenate, at length proliferous; fructification brown. *Ach.* Syn. Lich. p. 254. *Smith*, E. B. t. 2438. *Hook.* Fl. Scot. 2. p. 62.

β. *cornuta*, podetia elongated, subulate, simple or branched,

pulverulent, white, substerile. *Ach.* Syn. Lich. p. 257. *Lichen cornutus*, E. B. t. 1836.

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 fimbriate.

6. C. *anomæa*, foliaceous, ash-coloured, brittle, segments imbricated, minute, crenate; podetia cylindrical, rough and foliaceous, cups turbinate, closed, at length dilated and radiate; fructification marginal, sessile or stalked, brownish-black. *Hook.* Fl. Scot. 2. p. 63. *Smith*, E. B. t. 1867. *Cenomyce gonorega*, *γ. anomæa*, *Ach.* Syn. p. 259.

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.

7. C. *gracilis*, foliaceous, segments very minute; podetia elongate, subulate, sterile and cup-bearing, smooth, greenish-brown, cups toothed at the margin, at length proliferous; fructification brown. *Hook.* Fl. Scot. 2. p. 63. *Smith*, E. B. t. 1264. *Cenomyce ecmocyna α gracilis*, *Ach.* Syn. Lich. p. 63.

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.*

8. C. *digitata*, foliaceous, segments minute, expanded, rounded, crenate; pulverulent beneath, as well as on the cylindrical, yellow-green podetia; cups narrow, the margin subincurved, proliferous, at length large, and the proliferous portions irregular. *Ach.* Syn. Lich. p. 267. *Smith*, E. B. t. 2439. *Hook.* Fl. Scot. 2. p. 63.

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,

crenato-dentate, at length dilated and torn; fructification sessile, pedicellate. *Ach.* Syn. Lich. p. 268. *Smith*, E. B. t. 1394. *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 cub-bearing; cups cyathiform, with spreading fertile margins; fructification large, at length podecillate. *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 subpodicillate, at length proliferous.

HAB. On the ground in heathy places, and on banks and stumps of trees in alpine woods.

Podetia much resembling those of C. *pyxidata*, 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 proliferous; 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.)

12. C. *racemosa*, podetia elongated, smooth, becoming squamose, greenish white, at length inflated, curved, branched; branches lax, subsecund, with diverging thorn-like apices; fructification brown and pale. *Ach.* Syn. Lich. p. 275. *Hook.* Fl. Scot. 2. p. 64.

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.

13. C. *furcata*, podetia elongated, smooth, livid reddish brown, dichotomous, the axils not perforated; branches aciculate, curved, the apex forked, diverging, fructification brown. *Ach.* Syn. Lich. p. 276. *Hook.* Fl. Scot. 2. p. 64.

Hab. On heaths, and in old barren woods. Dunearn. Pentland Hills.

Pretty common, and sufficiently well marked.

14. C. *uncialis*, podetia elongate, glabrous, pale, dichotomous, axils perforated, open, the summits of the branches patent, short, rigid; fructification terminal, brown. *Ach.* Syn. Lich. p. 276. *Smith*, E. B. t. 174. *Hook.* Fl. Scot. 2. p. 64.

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.

15. C. *rangiferina*, podetia elongate, cylindrical, erect, rather rough, ash-coloured, branched, the axils often perforated; ultimate ramuli subdiverging, incurved or nodding at the apex; fructification subglobose, brown, clustered. *Ach.* Syn. Lich. p. 277. *Smith*, E. B. t. 277. *Hook.* Fl. Scot. 2. p. 65.

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.

112. BŒOMYCES. *Ehrh.*

1. B. *roseus*, crust uniform, warty, hoary; podetia very short, cylindrical; fructification subglobose, pale flesh-colour. *Ach.* Syn. Lich. p. 280. *Hook.* Fl. Scot. 2. p. 65. *B. ericetorum*, *Smith*, E. B. t. 372.

Hab. Heaths and banks in subalpine countries. Pentland Hills, rare.

A very distinct species; larger than the following.

2. B. *rufus*, crust uniform, rugose and granulated, pulverulent, whitish or greenish grey; podetia short, subcompressed; fructification somewhat convex, at length conglomerated, reddish-brown. *Ach.* Syn. Lich. p. 280. *Hook.* Fl. Scot. 2. p. 65. *Smith*, E. B. t. 373.

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,

simple or branched, disk of the fructification brownish-grey. *Ach.* Syn. Lich. p. 281. *Smith*, E. B. t. 1541. *Hook.* Fl. Scot. 2. p. 66.

HAB. Rocks and stones in alpine situations. Blackford Hill, Sir J. E. Smith. Pentland Hills, Maughan. In the latter habitat it is in some places very fine and abundant.

The only species of this genus hitherto detected in this vicinity, and therefore not liable to be mistaken. It sometimes covers a large surface of rock with its thick crust, the *podetia* of which are of small diameter, and sometimes so crowded as to render the summits only visible, and give the crust a papillose character.

114. STEREOCAULON. *Schreb.*

1. S. *paschale*, blueish-grey, branched, granulated, fibrillose; branches crowded with short ramuli; fructification scattered and terminal, at length convex conglomerated, blackish-brown. *Ach.* Syn. Lich. p. 284. *Smith*, E. B. t. 282. *Hook.* Fl. Scot. 2. p. 66.

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.*

1. S. *coralloides*, pale brown, stem seldom divided, the branches lateral, elongated, lax, divaricate, forked, acuminate, fibrillose; fructification subglobose, smooth. *Ach.* Syn. Lich. p. 287. *Hook.* Fl. Scot. 2. p. 67. *Lichen globiferus*, *Smith*, E. B. t. 115.

HAB. On rocks and on the ground in heathy and stony places. Pentland Hills.

From 1 to 3 inches high. Lateral branches remarkably attenuated.

2. S. *fragile*, greyish, branched; branches dichotomous, short, crowded, fastigiate, naked, round, somewhat obtuse; fructification globoso-turbinate, rather warty. *Ach.* Syn. Lich. p. 287. *Smith*, E. B. t. 2474. *Hook.* Fl. Scot. 2. p. 67.

HAB. Rocks and stony places in alpine situations. Pentland Hills.

This species forms a dense tuft. It is much and shortly branched, the branches glabrous and cylindrical; when sterile having their apex subobtuse; 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.

3. S. *compressum*, whitish, branched; branches compressed, set with naked subfibrillose ramuli; fructification subglobose, somewhat depressed above and smooth. *Ach.* Syn. Lich. p. 287. *Hook.* Fl. Scot. 2. p. 67. *Lichen fragilis*, *Smith*, E. B. t. 114.

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.*

1. A. *jubata*, frond rounded, somewhat shining, livid brown or dark brownish-green, and even black, much branched; branches filiform, pendulous, compressed at the axils; fructification of the same colour as the frond. *Ach.* Syn. Lich. p. 291. *Hook.* Fl. Scot. 2. p. 67. *Smith*, E. B. t. 1880.

HAB. On rocks and trunks of old trees in subalpine situations. Pentland Hills, Maughan. Swanston wood.

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.*

1. R. *fraxinea*, plane, linear-laciniate, grey, smooth on both sides, rugose, pitted, the ultimate segments lanceolate and attenuated; fructification marginal, pale flesh-coloured. *Ach.* Syn. Lich. p. 296. *Smith*, E. B. t. 1781. *Hook.* Fl. Scot. 2, p. 68.

HAB. On the trunks and branches of trees. Common.

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 *Stictæ*. *Fructification* sometimes very large.

2. R. *fastigiata*, rounded or subcompressed, smooth, pitted, branched, greyish or glaucous white, branches thickened above and fastigiate; fructification terminal, white, sessile or slightly peltate. *Ach.* Syn. Lich. p. 296. *Smith*, E. B. t. 890. *Hook.* Fl. Scot. 2. p. 68.

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.

3. R. *scopulorum*, frond compressed, smooth, somewhat pitted, branched, pale grey; branches linear, attenuated; fructification scattered, pedicellated, similar in colour to the frond. *Ach.* Syn. Lich. p. 297. *Smith*, E. B. t. 688. *Hook.* Fl. Scot. 2. p. 68.

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,

greyish-white; branches linear and attenuated; fructification scattered, pedicellate, plane, subimmarginate, white. *Ach.* Syn. Lich. p. 298. *Smith*, E. B. t. 889. *Hook.* Fl. Scot. 2. p. 68.

HAB. On trees. About Edinburgh; Granton; Swanston, Corstorphine, Rosslyn, 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.*

1. C. *aculeata*, glabrous, brownish-chesnut, roundish, angulose, pitted, subcompressed, nearly naked; branches and branchlets divaricated, flexuose, prickly; fructification reddish, with the circumference subdentate reflexed. *Ach.* Syn. Lich. p. 299.

β, *spadicea*, frond glabrous, chesnut-coloured, plano-compressed, somewhat pitted, margin denticulate; branches and branchlets short, patent, attenuated; fructification reddish-brown, radiated with spinous processes. *Ach.* Syn. Lich. p. 300. *Hook.* Fl. Scot. 2. p. 69. *Lichen hispidus*, *Smith*, E. B. t. 452.

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.*

1. U. *florida*, somewhat erect, rough, pale greyish or greenish, set with fine horizontal fibres; branches patent, nearly simple; fructification plane, very broad, whitish, ciliated, the ciliæ radiating and elongated. *Ach.* Syn. Lich. p. 304. *Smith*, E. B. t. 872. *Hook.* Fl. Scot. 2. p. 70.

HAB. On trees. Swanston wood, Maughan.

A fine lichen, of 2–4 inches in length, and, from its rigidity, suberect habit, thicker branches, horizontal fibrillæ, more frequent and larger *fructification*, distinguished from the following species.

2. U. *plicata*, pendulous, smooth, pale, branches lax, much divided, subfibrillose, the ultimate ones capillary; fructification plane, broad, ciliated, the ciliæ slender, very long. *Ach.* Syn. Lich. p. 305. *Smith*, E. B. t. 257. *Hook.* Fl. Scot. 2. p. 70.

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).*

1. C. *crispum*, suborbicular, the central lobes somewhat erect, granulated, those of the circumference depressed, larger, obtuse, crenulate; fructification scattered, rather concave, reddish, with a granulated margin. *Ach.* Syn. Lich. p. 311. *Smith*, E. B. t. 834.

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.

2. C. *melænum*, orbicular, substellate, imbricated; lobes torn and laciniate, with raised, waved, crisped and crenulate margins; fructification marginal, plane, similar in colour to the frond, with the border granulated. *Ach.* Syn. Lich. p. 315. *Hook.* Fl. Scot. 2. p. 71. *Lichen marginalis* (C. *melænum* β), *Smith*, E. B. t. 1924.

Hab. Rocks. Walls, &c. about Edinburgh, J. Stewart.

Gelatinous, black when dried; laciniæ long and radiating, imbricated, depressed, and, from the margins being somewhat elevated, canaliculate, very irregularly lobed, the lobes lacerate and crenate. *Fructification* when old reddish, and the disk dotted.

** *Foliaceous; lobes membranaceous, blackish-green.* (Lathagrium).

3. C. *nigrescens*, foliaceous, membranaceous, submonophyllous, orbicular, depressed, plaited in a radiate manner, roundly lobed, black-green; fructification central, crowded, at length convex, brownish-red, with a very entire border. *Ach.* Syn. Lich. p. 321. *Smith*, E. B. t. 345. *Hook.* Fl. Scot. 2. p. 71.

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.* (Leptogium).

4. C. *tremelloides*, foliaceous, membranaceous, thin, subdiaphanous, lead-colour, obsoletely rugose and dotted; lobes rounded, cut, entire; fructification scattered, subpedicellate, plane, reddish, at length black, with a pale border. *Ach.* Syn. Lich. p. 326. *Smith*, E. B. t. 1981. *Hook.* Fl. Scot. 2. p. 72.

HAB. Trunks of trees, or on the ground among mosses. Pentland Hills, rare.

Gelatinous, membranaceous, marked with smooth impressions of obsolete rugæ; lobes broad, rather long, with a cut and lobed margin, lax and crowded. *Border* of the *fructification* pale and entire.

5. C. *lacerum*, foliaceous, membranaceous, subdiaphanous, subrugose, glaucous; lobes small, subimbricated, torn, laciniate, toothed or ciliate; fructification scattered, somewhat concave, red, with a pale margin. *Ach.* Syn. Lich. p. 327. *Smith*, E. B. t. 1982. *Hook.* Fl. Scot. 2. p. 72.

HAB. On the ground among mosses. Craiglockhart.

Lobes much crowded and variously laciniate, so much so, that the general aspect of the species is liable to be much changed. *Laciniæ* often erect, and frequently densely fimbriate, sometimes toothed or even elongated into very narrow crowded ciliæ. The whole plant is sometimes so dense and cushion-like, that, until it is torn asunder, the structure cannot be examined.

121. LEPRARIA. *Ach.*

1. L.? *latebrarum*, grey or whitish, crust forming dense, light, cushion-like tufts, composed of minute granules, intermixed with hyaline, jointed filaments. *Ach.* Syn. Lich. p. 331. *Smith*, E. B. t. 2147. *Hook.* Fl. Scot. 2. p. 73.

HAB. Rocks. Braid Hermitage, and in Ravelston wood, Sir J. E. Smith. Pentland Hills.

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. *æruginosa*, *Jolithus*, and *Chlorina*.

2. L.? *æruginosa*, light verdigris-green; crust soft, light, pulverulent, intermixed with branched, jointed, hyaline filaments. *Smith*, E. B. t. 2182. *Hook.* Fl. Scot. 2. p. 73. *Conferva pulveria*, *Dillw.* Conf. Syn. 78. t. D.

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.

3. L.? *chlorina*, crust thick, pulverulent, greenish-yellow, in the form of little conglomerated villous globules. *Ach.* Syn. Lich. p. 329. *Smith*, E. B. t. 2038. *Hook.* Fl. Scot. 2. p. 73.

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 microscopical examination.

4. L. *flava*, spreading, even, thin, slightly cracked, very bright yellow, composed of naked, subglobose granules. *Ach.*

Syn. Lich. p. 330. *Smith*, E. B. t. 1350. *Hook.* Fl. Scot. 2. p. 73.

HAB. Trunks of trees. About Edinburgh. Rosslyn and other woods, Maughan.

The extremely bright yellow colour of this species, unmixed by any shade of even green or red, distinguishes it at first sight.

5. L. *botryoides*, crust thin, spreading, pulverulent, deep green, and composed of connected and clustered granules. *Ach.* Syn. Lich. p. 331. *Smith*, E. B. t. 2148. *Hook.* Fl. Scot. 2. p. 73.

HAB. Trunks of trees, abundant everywhere.

Too well marked to need farther description; the beaded manner in which the granules are connected is very striking, but the structure of the granules themselves renders the propriety of retaining it in this genus extremely doubtful.

6. L. *nigra*, crust filmy, greyish, granulated in patches, the granules extremely minute, in thin, even layers, quite black. *Turn. & Borr.* Lich. Brit. ined. p. 21. (fide Hook.) *Smith*, E. B. t. 2409.

HAB. Trunks of trees, old paling, &c. Colinton wood, Maughan.

Sufficiently distinguished by its colour.

7. L. *cinereo-sulphurea*, very thin, submembranaceous, whitish, with its surface scattered over with very minute, aggregated, granules, greenish-yellow at first, afterwards cinereous. *Ach.* Syn. Lich. p. 330.

HAB. On the trunks of Scotch Firs. Swanston wood.

The granules are yellow or greenish-white in the young state, becoming at length grey, or even brownish; scattered at first, but afterwards very crowded.

XI. HYPOXYLA. *De Cand. Grev.*

I. PSEUDO-LICHENES. *Accompanied by a crust. Sporuliferous mass obscure or not spontaneously emitted.*

122. OPEGRAPHA. *Pers.*

1. O. *vulgata*, crust between cartilaginous and membranaceous, somewhat scaly, greenish-grey; fructification long or roundish, waved, somewhat shining, the disk very narrow. *Ach.* Syn. Lich. p. 73. *Smith*, E. B. t. 1811. *Hook.* Fl. Scot. 2. p. 43.

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.

3 O. *macularis*, crust determinate, brownish-black; fructification minute, very crowded, roundish-elliptical, at length rugose and irregular; disk a mere cleft. *Ach.* Syn. Lich. p. 72. *Hook.* Fl. Scot. 2. p. 43. O. *epiphega*, *Smith*, E. B. t. 2282.

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.

4. O. *scripta*, crust membranaceous, smooth, somewhat shining, whitish, with a black margin; fructification immersed, simple or branched, naked, furnished with a raised border formed by the crust. *Smith*, E. B. t. 1813. *Graphis scripta*, *Ach.* Syn. Lich. p. 81. *Hook.* Fl. Scot. 2. p. 43.

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.*

1. V. *maura*, crust exceedingly thin, smooth, cracked, black; fructification very minute, subglobose, immersed, the apex prominent, umbilicated, the interior blackish. *Ach.* Syn. Lich. p. 95. *Hook.* Fl. Scot. 2. p. 43. *Lichen maurus*, *Smith*, E. B. t. 2456.

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.

2. V. *epidermidis*, crust exceedingly thin, spreading, quite white; fructification minute, roundish, subelliptical, tubercles semi-immersed, the interior white. *Ach.* Syn. Lich. p. 89.

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-

what immersed, shining tubercles. *Pyrenula nitida, Ach.* Syn. Lich. p. 125.

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 *Sphæria* by some authors.

124. PORINA. *Ach.*

1. P. *pertusa*, crust smooth, whitish or greenish-grey; fructification spherules included in irregularly globose warts, opening by black orifices. *Ach.* Syn. Lich. p. 109. *Hook.* Fl. Scot. 2. p. 45. *Lichen pertusus, Smith*, E. B. t. 677.

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.*

1. R. *subcorticalis*, compressed, brown or black, shining, anastomosing, often broad and very extensive. *Pers.* Syn. Fung. p. 704. Rh. *fragilis, Roth.* Cat. Bot. 1. p. 232. Rh. *patens, Sow.* Fung. 392. f. 1, 2.

HAB. Between the bark and the wood of trees, especially Firs in decay. The whole year. Extremely common.

Variously 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. Drumshoreland 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.*

1. X. *hypoxylon*, gregarious, branched, compressed, black, white and farinaceous towards the apex, downy at the base. *Sphæria hypox. Pers.* Syn. Fung. p. 5. *Hook.* Fl. Scot. 2. p. 4. *Sow.* Fung. t. 55.

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. *Sphæria 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. *Spherules* much larger than in the preceding.

3. X. *polymorpha*, black, gregarious, simple or divided; peduncle passing into a ventricose receptacle, containing spherules beneath its whole surface. *Sphæria polymorpha, Pers.* Syn. p. 7. *Hook.* Fl. Scot. 2. p. 4. *Sph. digitata, Sow.* p. 69.

HAB. Rotton 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. STROMATOSPHÆRIA. *Grev.*

* *Receptacle free; (not bursting through the bark).*

1. St. *concentrica*, large, black, somewhat hemispherical, surface smooth, the orifices of the spherules scarcely at all raised; within composed of regular concentric strata. *Sphæria concentrica, Pers.* Syn. Fung. p. 8. *Hook.* Fl. Scot. 2. p. 4. *Sph. fraxinea, Sow.* Fung. t. 160.

HAB. On trunks, chiefly of Ash trees. About Edinburgh. Trees in the Meadows.

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

dotted with raised points. *Sphæria deusta, Pers.* Syn. Fung. p. 16. *Hook.* Fl. Scot. 2. p. 5. *Sph. maxima, Sow.* Fung. t. 338.

HAB. On rotten stumps of fallen trees about Edinburgh, not frequent.

Substance at first carnoso-coriaceous, 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.

3. St. *fusca*, brown, hemispherical, depressed, somewhat confluent when crowded, the interior of the same colour; spherules very slightly prominent. *Sphæria fusca, Pers.* Syn. Fung. p. 12. *Hook.* Fl. Scot. 2. p. 5.

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.

4. St. *undulata*, black, thickish, undulato-rugose, whitish within; mouths of the spherules round, and somewhat prominent. *Sphæria undulata, Pers.* Syn. Fung. p. 21. *Hook.* Fl. Scot. 2. p. 5.

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.

5. St. *striæformis*, black, gregarious, forming linear or oblong striæ, smooth; spherules very minute, without obvious mouths. *Sphæria striæf. Pers.* Syn. Fung. p. 32. *Hook.* Fl. Scot. 2. p. 6.

HAB. On the dead stems of the larger herbaceous plants. About Edinburgh.

Striæ 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. *Sphæria 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.*

7. St. *stigma*, black, plane, spreading transversely on the branches, smooth, the inside whitish; mouths of the spherules not prominent. *Sphæria stigma, Pers.* Syn. Fung. p. 21. *Hook.* Fl. Scot. 2. p. 5.

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.

8. St. *decorticata*, black, plane, spreading longitudinally, white within; mouths of the spherules somewhat prominent, conical. *Sphæria decort. Sow.* Fung. t. 137.? *Sph. stigma*, β, *Pers.* Syn. Fung. p. 21.

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.

9. St. *lata*, black, plane, widely spreading, somewhat rugose, at first subdistinct, at length confluent, and united by a kind of irregular crust; mouths of the spherules conical, rough and angular. *Sphæria lata*, *Pers.* Syn. Fung. p. 29. *Hook.* Fl. Scot. 2. p. 6.

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.

10. St. *ulmaria*, greyish-black, scattered, plano-convex, roundish, parasitic on elm leaves; surface papillose with the mouths of the spherules. *Sphæria ulmaria*, *Sow.* Fung. t. 374. f. 3. *Sph. xylomoides*, *De Cand.* Fl. Franç.

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.

11. St. *disciformis*, scattered, distinct, very gregarious, round, elevated, plane, dark brown, dotted with the orifices of the spherules; orifices nearly plane, 2–4-cleft. *Sphæria discif. Pers.* Syn. Fung. p. 24. *Hook.* Fl. Scot. 2. p. 5. Sph. *depressa*, *Sow.* Fung. t. 216.?

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.

13. St. *ribesia*, rather small, roundish-elliptical, dull black, bursting transversely through the bark, depressed, rugoso-sulcate, surface minutely rough with the mouths of the spherules. *Pers.* Syn. Fung. p. 14. *Hook.* Fl. Scot. 2. p. 5.

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 laciniæ. The black ring which surrounds the base is about a line and a half in diameter.

†† *Orifices of the spherules more or less spinose.*

15. St. *nivea*, scattered, very gregarious, somewhat conical, roundish, the disk pulverulent, white; orifices of the spherules somewhat prominent and converging. *Pers.* Syn. Fung. p. 38. *Hook.* Fl. Scot. 2. p. 6.

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.

16. St. *prunastri*, deep black, bursting transversely through the bark, oblong, elevated; orifices of the spherules crowded, level-topped, acutely 4-sided, and grooved. *Pers.* Syn. Fung. p. 37. *Hook.* Fl. Scot. 2. p. 6.

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.

17. St. *quercina*, black, round, much elevated, very gregarious, the orifices thick, irregular, 4-sided. *Pers.* Syn. Fung. p. 24.

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.

18. St. *ferruginea*, black, gregarious, sometimes subconfluent, bursting transversely through the bark, ferruginous within; orifices of the spherules erect, straight, cylindrical, spinose. *Pers.* Syn. Fung. p. 35. *Hook.* Fl. Scot. 2. p. 6.

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 *Pers.* Syn. Fung. p. 40. *Hook.* Fl. Scot. 2. p. 6.

HAB. On dead branches of various trees, not unfrequent.

Concealed beneath the bark, except the orifices, which are considerably exserted. *Orifices* pretty constantly umbilicate at the apex.

128. CUCURBITARIA. *Gray.*

1. C. *Berberidis*, black, elliptical-oblong, bursting longitudinally through the bark; spherules seated on the receptacle, crowded, rugose, somewhat tesselated. *Grev.* Crypt. Fl. t. 84. *Sphæria Berberidis*, *Pers.* Syn. Fung. p. 52.

HAB. 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 containing the sporules attenuated at each extremity. *Grev.* Crypt. Fl. t. 50.

HAB. 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. *Sphæria coccinea*, *Pers.* Syn. Fung. p. 49. *Hook.* Fl. Scot. 2. p. 7.

HAB. On the dead branches of various trees, frequent.

Varying much in size, being sometimes above a line broad, at others merely consisting of the receptacle and two or three spherules. The fine colour, 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. *Sphæria decolorans*, *Pers.* Syn. Fung. p. 49. *Hook.* Fl. Scot. 2. p. 6. *Sph. fragiformis*, *Sow.* Fung. t. 256.

HAB. 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. CRYPTOSPHÆRIA. *Grev.*

* *Spherules collected into circular clusters.*

1. Cr. *fagínea*, black; spherules few, the mouths elongated, rough, converging. *Pers.* Syn. Fung. p. 44.

HAB. On dead branches of Beech trees, not unfrequent.

Small. *Spherules* usually 4–8, the elongated mouths curved upwards rather suddenly, and protruded through the bark.

2. Cr. *pulchella*, black; spherules aggregated, forming a dense circle; mouths filiform, flexuose, converging, depressed. *Grev.* Crypt. Fl. t. 67. *Pers.* Syn. Fung. p. 43.

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.*

3. Cr. *Gnomon*, spherules few, aggregated, globose, black, the orifice suberect, filiform, shining, style-like. *Sphæria Gnomon*, *Pers.* Syn. Fung. p. 61.

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. *Sphæria 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.

6. Cr. *Taxi*, minute, scattered; spherules depressed, the mouth very short, not exserted; epidermis of the leaf convex and slightly ruptured; sporules naked, extremely minute. *Grev.* Crypt. Fl. t. 13. *Sphæria Taxi*, *Sow.* Fung. t. 394. f. 6.

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.

7. Cr. *strobolina*, black, roundish-oblong, scattered, bursting through the epidermis; orifice? irregular, papillose. *Sphæria strobolina*, *Moug. et Nest.* Pl. Exsicc. No. 572. *Hook.* Fl. Scot. 2. p. 8.

HAB. On the scales of dead Fir cones. About Edinburgh.

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. *Sphæria Lauri, Sow.* Fung. t. 371. f. 4.

HAB. On the dead Leaves of the Common Laurel. Slateford and elsewhere.

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. *Sphæria bifrons, Sow.* Fung. t. 316.

HAB. 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.

10. Cr. *aurantia*, gregarious, often crowded; spherules yellowish, globose, somewhat carnose; mouths short, cylindrical, very obtuse, exserted, surrounded at their base by an orange web. *Sphæria aurantia, Pers.* Syn. Fung. p. 68.

HAB. On decaying Agarics and Boleti, rare. Newliston woods, Messrs. Wauch and Greville.

Spherules 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.

HAB. On the dead branches of *Tamarix germanica*, in the garden of David Falconer, Esq. Carlowrie.

Spherules 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. *Sphæria semi-immersa, Pers.* in litt.

HAB. On dead branches of Honeysuckle. About Edinburgh.

Unequally scattered, black, shining, the older spherules intermixed with the young ones, the latter appearing like mere dots.

13. Cr. *Herbarum*, spherules minute, scattered, very numerous, black, round, depressed, orifice papilliform, piercing the

epidermis like minute dots, at length naked when it decays. *Sphæria Herbarum*, *Pers.* Syn. Fung. p. 78. *Hook.* Fl. Scot. 2. p. 7.

HAB. On the dead stalks of large herbaceous plants, especially on the *Umbelliferæ*; very common.

Minute, very gregarious, mostly round, sometimes oval, depressed, often almost plane, the orifice very small.

14. Cr. *nebulosa*, spherules excessively minute, scattered, forming dark greyish, cloud-like, longitudinal spots on the smooth stalks of plants, the orifice somewhat acute, penetrating the epidermis. *Sphæria nebulosa*, *Pers.* Syn. Fung. p. 31.

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. *Sphæria capill. 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.

16. Cr. *Ægopodii*, scattered or in small groups, minute, blackish, roundish, producing pale spots on the leaf. *Sphæria Ægopodii*, *Pers.* Syn. Fung. p. 89. *Hook.* Fl. Scot. 2. p. 8.

HAB. On the leaves of *Ægopodium Podagraria*, while yet green, frequent.

Spherules of unequal size, rugose under the microscope, black and somewhat shining.

17. Cr. *punctiformis*, scattered, very gregarious, punctiform, somewhat shining, rarely dehiscent. *Sphæria punctif. Pers.* Syn. Fung. p. 90. *Hook.* Fl. Scot. 2. p. 8.

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.

HAB. On dead leaves of Portugal Laurel. About Edinburgh.

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.*

1. S. *spermoides*, black, globose, nearly smooth, crowded, the orifice minute, slightly papilliform. *Grev.* Crypt. Fl. t. 6. *Pers.* Syn. Fung. p. 75. *Hook.* Fl. Scot. 2. p. 7.

HAB. On rotten wood, not unfrequent.

Spherules opake, black, usually excessively crowded. *Sporules* oblong, escaping in the form of a white powder.

2. S. *Peziza*, fine red, minute, smooth, gregarious, globose, with a very minute papilliform orifice; spherules at length collapsed and concave. *Pers.* Syn. Fung. p. 66. *Hook.* Fl. Scot. 2. p. 7.

HAB. On dead, rather dry wood, frequent.

Spherules growing in very irregular clusters, extremely minute, brittle.

3. S. *Doliolum*, black, scattered, gregarious, roundish-ovate, acute, shining, the mouth papilliform. *Pers.* Syn. Fung. p. 78. *Hook.* Fl. Scot. 2. p. 7.

HAB. On dead stalks of large herbaceous plants, especially the Umbelliferæ.

Spherules scattered, or so crowded as to be contiguous, somewhat conical, the mouth round, papilliform.

4. S.? *Patella*, much scattered, black, cylindrico-globose, plane at the apex when moist, when dry collapsed, the margin rounded and plicate. *Pers.* Syn. Fung. p. 76. *Hook.* Fl. Scot. 2. p. 7.

HAB. On the dead stalks of large herbaceous plants, chiefly the Umbelliferæ, after the epidermis has been removed.

Spherules attached by the whole base, elevated, somewhat shining, remarkably concave from collapsion.—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-

tous stratum, which sometimes partly envelopes the spherules. *Pers.* Syn. Fung. p. 67.

HAB. On dead branches of trees. Abercorn Park, Duddingston.

Filamentous stratum, widely spreading, *Spherules* numerous, often very crowded, nearly a line in diameter.

6. S. *hirsuta*, gregarious, somewhat clustered, quite black, spherules roundish-ovate, somewhat tuberculate, with short, rigid, scattered hairs; orifice obtuse. *Pers.* Syn. Fung. p. 73. *Hook.* Fl. Scot. 2. p. 7.

HAB. On dead branches, wood, &c. Rosslyn woods.

Spherules small, the hairs short, black, shining, appearing to be disposed in fasciculi.

7. S. *pilosa*, spherules minute, crowded, roundish, when young appearing like one mass of diverging brown hairs, at length almost naked towards the apex, and black; orifice minute papilliform. *Pers.* Syn. Fung. p. 73.

HAB. On dead wood in shady mossy places. Braid Hermitage.

Sporules covered with rigid, diverging, shining hairs, which in age seem to be, as it were, worn off by attrition.

8. S. *calva*, black, gregarious, hemispherical, minutely granulated, the apex naked, somewhat shining, the base hairy; orifice papillose. *Pers.* Syn. Fung. p. 74.

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.

9. S. *aurea*, gregarious very crowded, ovate, somewhat acuminate, orange; orifice indistinct, but the sporules escape in a pulverulent form. *Grev.* Crypt. Fl. t. 47.

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. *Sporules* in filiform, hyaline tubes.

** *Spherules without an evident orifice.*

10. S. *moriformis*, gregarious, obovate, deep black, smooth, tuberculated. *Pers.* Syn. Fung. p. 86. *Hook.* Fl. Scot. 2. p. 8. Sph. *claviformis*, *Sow.* Fung. t. 337.

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.

11. S. *rugosa*, minute, black, scattered, globose, very rugose and tuberculated, parasitic on the pileus of Polyporus abietinus. *Grev.* Crypt. Fl. t. 39.

HAB. On dead *Polyporus abietinus*, rare. Carlowrie.

Spherules globose or oval, so rugose as to be almost tesselated. *Sporules* subglobose, in filiform hyaline tubes.

12. S. *pulvis-pyrius*, spherules black, minute, very numerous, crowded, roundish, somewhat tuberculate, and often with a transverse furrow. *Pers.* Syn. Fung. p. 86. *Hook.* Fl. Scot. 2. p. 8.

HAB. On dead, dry wood, frequent.

Spherules minute, very black, seed-like, generally so crowded as to be contiguous.

131. POLYSTIGMA. *Pers.*

1. P. *rubrum*, reddish-orange, plane. *Pers.* in Moug. et Nestl. No. 270. *De Cand.* Fl. Franç. v. 5. p. 164. *Xyloma rubrum*, *Hook.* Fl. Scot. 2. p. 9.

HAB. On the living leaves of *Prunus spinosus*. Auchindenny woods.

Two to four lines broad, plane, somewhat carnose, of an irregular form, the surface dotted with the orifices of the fructification.

2. P. *typhinum*, pale yellow-orange, investing the culms of living grasses. *De Cand.* Mem. du Mus. d'Hist. Nat. v. 3. *Sphæria typhina*, *Pers.* Syn. Fung. p. 29. *Hook.* Fl. Scot. 2. p. 6.

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. Carlowrie.

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.*

1. Ph. *coronatum*, orbicular, subhemispherical, depressed, black, dehiscent in numerous acute segments; disk pale greenish or yellowish. *Grev.* Crypt. Fl. t. 52. *Xyloma pezizoides*, *Pers.* Syn. Fung. p. 105. *Peziza comitialis*, *Sow.* Fung. t. 118.

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.

2. Ph. *dentatum*, four-sided, small, black, on whitish spots on the leaf, splitting into 4–5 acute segments; disk dingy. *Schm.* et *Kunze*, Mykol. Hefte, p. 41. *Sphæria punctiformis*, *γ*, *Pers.* Syn. Fung. p. 91. *Xyloma lichenoides*, *De Cand.* Syn. Fl. Gall. p. 53.

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.*

1. St. *microsperma*, black, granulated, irregularly ovate, at length shapeless; sporules ovate, attenuated at each extremity. *Pers.* Syn. Fung. p. 96.

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. *biloculata*, black, roundish, bursting through the bark; sporules ovate, obtuse, 2-celled.

HAB. On dead branches of Furze (*Ulex europæus*), frequent.

Scattered, sometimes crowded, dull black, raised, the surface plano-convex.

135. HYSTERIUM. *Pers.*

1. H. *quercinum*, bursting through the bark, oblong-elliptical, flexuose, somewhat ventricose, greyish-brown. *Pers.* Syn. Fung. p. 100.

HAB. On dead Oak branches, frequent. Auchindenny and Rosslyn woods.

Gregarious, bursting through the bark in no particular direction, 2–3 lines long.

2. H. *pulicare*, gregarious, black, oblong or roundish-elliptical, obtuse, somewhat striate. *Pers.* Syn. Fung. p. 98. *Hook.* Fl. Scot. 2. p. 8.

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.

3. H. *angustatum*, gregarious, linear, narrow, parallel, smooth, of a dull black. *Pers.* Syn. Fung. p. 99. *Hook.* Fl. Scot. 2. p. 8.

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.

4. H. *Fraxini*, convex, tumid, oblong-elliptical, very black, disposed in a subconcentric manner; sporules large, oblong, yellow. *Grev.* Crypt. Fl. t. 72. *Pers.* Syn. Fung. p. 100. *Hook.* Fl. Scot. 2. p. 8. *Sphæria sulcata*, *Sow.* Fung. t. 315.

HAB. On dead Ash branches, frequent. Slateford, Craiglockhart, &c.

At first bursting through the bark, at length naked, corneous, obtuse. *Sporules* 6–8 in clavate tubes.

5. H. *Pinastri*, minute, oval-elliptical, depressed, the margin plane, paler, often bounded by a darker line, the centre slightly raised. *Grev.* Crypt. Fl. t. 60. *Pers.* Syn. Fung. p. xxviii. *Hook.* Fl. Scot. 2. p. 8.

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.

6. H. *Juniperi*, very minute, oval, shining, somewhat plane, growing longitudinally on the leaf; sporuliferous tubes clavate, acuminate at the apex. *Grev.* Crypt. Fl. t. 26.

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.

7. H. *gramineum*, very minute, linear-elliptical, black, mostly on the ribs of the leaf or culm. *Pers. Grev.* Crypt. Fl. t. 87.

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.*

1. X. *acerinum*, black, spreading in large irregular spots, which are either uniform, or composed of somewhat distinct dots; dehiscence irregular and rugose. *Pers.* Syn. Fung. p. 104. *Hook.* Fl. Scot. 2. p. 9. X. *punctatum*, *Pers.* l. c. p. 104.

HAB. On living leaves of the sycamore. (*Acer pseudo-platanus*), very common.

Spots from one-fourth to above half an inch broad, quie black, the surface rugose, marked in age with gyrose lines. *Perithecia* contiguous, varying in form, mostly linear-flexuose, not always bursting.

2. X. *salicinum*, large, irregular, very thick, black, white within. *Pers.* Syn. Fung. p. 103.

HAB. On living leaves of *Salix capræa*, 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.*

3. X. *salignum*, gregarious, sometimes crowded, roundish, slightly convex, brown, at length blackish. *Pers.* Syn. Fung. p. 106.

HAB. On decaying leaves of *Salix capræa*, not unfrequently; Rosslyn woods.

Spots about one-third, rarely half a line broad, at first pale yellowish-brown.

4. X. *populinum*, gregarious, rarely scattered over the whole surface, flattish, irregular, smooth, dull black. *Pers.* Syn. Fung. p. 107.

HAB. On the leaves of the aspen, not common. Near Kirkliston.

Brownish at first, at length opake 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.

6. X. *fagineum*, minute, crowded, often in circular groups, round, black, shining, plane, rugose. *Pers.* Syn. Fung. p. 107.

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.

7. X. *alneum*, very minute, regularly scattered, black, shining, round rugoso-papillose, within convex. *Pers.* Syn. Fung. p. 108.

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.

8. X. *concava*, minute, roundish, regularly scattered, black, shining, smooth, the upper half separating. *Sphæria concava*, *Sow.* Fung. t. 307.

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 sporules.

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. *Alchemillæ*, 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.

XII. FUNGI. *Link. Grev.*

DIV. I. *Plants with a pileus or cap; hymenium on the under surface, in the form of straight, simple lamellæ, (gills,)* (AGARICOIDEÆ).

138. AMANITA. *Dill.*

1. A. *muscaria*, margin of the pileus striated, orange-red, shining, warty, rarely naked; volva vanishing, scaly; stipes bulbous. *Pers.* Syn. Fung. p. 253. *Hook.* Fl. Scot. 2. p. 19. *Agaricus muscarius*, *Sow.* Fung. t. 286. *Fries*, Syst. Mycol. v. 1. p. 16.

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. *Lamellæ* 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. Lamellæ 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. Lamellæ 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.

1. Ag. *procerus*, large; pileus scaly, lamellæ distant, white; stipes very long, bulbous, collar free. *Curt. et Hook.* Fl. Lond. ed. 1. & 2. with a fig. *Sow.* Fung. t. 190. *Pers.* Syn. p. 257. *Hook.* Fl. Scot. 2. p. 23. *Fries.* Syst. Mycol. v. 1. p. 20.

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.

2. Ag. *clypeolarius*, inodorous; pileus white, with the epidermis broken into feruginous scales; lamellæ white, numerous; stipes subsquamose; collar mostly fugacious. *Sow.* Fung. t. 14. *Hook.* Fl. Scot. 2. p. 23. *Fries*, Syst. Mycol. v. 1. p. 21. *Ag. colubrinus*, *Pers.* Syn. Fung. p. 258.

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*.

3. Ag. *cristatus*, highly odorous, surface of the pileus white, with reddish scales; lamellæ distinct; stipes smooth; collar fugacious. *Bolt.* Fung. t. 7. *Fries*, Syst. Mycol. v. 1. p. 22. *Ag. colubrinus*, *var. γ. Pers.* Syn. Fung. 259.

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.

4. Ag. *granulosus*, pileus, with furfuraceous scales, reddish-yellow; lamellæ fixed, white; stipes subsolid, covered below the veil with squarrose scales. *Pers.* Syn. Fung. p. 264. *Fries*, Syst. Mycol. v. 1. p. 24. *Ag. croceus*, *Sow.* Fung. t. 19.

HAB. In woods, especially among fir-trees, in Autumn. Swanston wood. Balmuto.

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, subfistulose 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.

5. Ag. *melleus*, tufted, rarely single; pileus dingy yellowish or reddish, rough with scales formed of black, rigid, fasciculated hairs; lamellæ slightly decurrent; stipes whitish, fibrillose, with a large annulus. *Bolt.* Fung. t. 141. *Fries*, Syst. Mycol. v. 1. p. 30. *Ag. stipitis*, *Sow.* Fung. t. 101. *Hook.* Fl. Scot. 2. p. 20. *Ag. polymyces*, *Pers.* Syn. Fung. p. 269.

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. *Lamellæ* 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. Lamellæ 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.

6. Ag. *eburneus*, white; pileus smooth, umbonate; lamellæ broad, distant, very decurrent; stipes white, scurfy, solid, becoming hollow in age. *Pers.* Syn. Fung. p. 364. *Fries*, Syst. Mycol. v. 1. p. 33. *Ag. virgineus*, *Sow.* Fung. t. 32. and *Ag. nitens?* t. 71. and *Ag. cossus*, t. 121.

HAB. In open pastures, rarely in woods. Autumn. Common about Edinburgh.

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. *Lamellæ* 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 while young: margin thin, at first inflexed, and united with the veil. Lamellæ unequal, juiceless, posteriorly obtuse.—Large fungi, remaining a considerable time, solitary or gregarious, mostly growing on the ground. Many are esculent.

7. Ag. *rutilans*, pileus obtuse, convex, deep yellow, more or less covered with crimson-red squamulose fibres; lamellæ rounded, numerous, yellow; stipes solid or partly hollow, streaked with red. *Pers.* Syn. Fung. p. 320. *Fries*, Syst. Mycol. v. 1. p. 41. *Ag. Xerampelinus*, *Sow.* Fung. t. 31.

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. *Lamellæ* numerous, broad, yellow, thickish, partly adnate with the stipes. *Flesh* yellow, rather spongy. *Stipes* firm, unequal, incrassated at the base, solid, rarely hollow, 2–4 inches high, ½–¾ 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 viscous. Margin only involute in the youngest state. Flesh firm, juiceless, white, with a subvesiculose structure. Lamellæ 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.

8. Ag. *nitidus*, pileus thin, with a sulcate margin; lamellæ broad, subdistant, equal, yellow. *Pers.* Syn. Fung. p. 444. *Fries*, Syst. Mycol. v. 1. p. 55. *Ag. nauseosus*, *Pers.* Syn. Fung. p. 446. and *Ag. vitellinus*, p. 442. *Ag. integer*, *Sow.* Fung. t. 201.? *(the yellow one.)*

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. *Lamellæ* subdistant, yellow, regularly equal, connected by veins. *Stipes* 1–1½ inches long, white or yellowish, solid, spongy. *Taste* not acrid, but rather nauseous.

9. Ag. *emeticus*, pileus compact, somewhat depressed in the centre, with the margin at length sulcate; lamellæ broad, subequal, very white. *Pers.* Syn. Fung. p. 439. *Fries.* Syst. Mycol. v. 1. p. 56. *Ag. integer*, *Sow.* Fung. t. 201. *Hook.* Fl. Scot. 2. p. 20. *Ag. ochroleuca*, *Pers.* Syn. 443.

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. *Lamellæ* subdistant, broad, rigid, thickish, connected together by small threads or veins, intermixed with a very few smaller lamellæ, 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; lamellæ unequal, distant, white, thick; stipes short, solid, very robust.

Pers. Syn. Fung. p. 459. *Fries*, Syst. Mycol. v. 1. p. 60. *Ag. nigricans*, *Bull.* t. 212–370. f. 2. & 579.

β. *elephantinus*, pileus yellowish-brown; lamellæ yellowish-white; stipes solid, white. *Ag. elephantinus*, *Sow.* Fung. t. 36. *Hook.* Fl. Scot. 2. p. 20.

HAB. In woods and shaded places, rather rare about Edinburgh. Dundas Hill, and at Balmuto. Autumn.

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. *Lamellæ* 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. Lamellæ 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).

11. Ag. *torminosus*, pileus glabrous, pale, with a yellowish, brownish, or greyish tinge, margin tomentose; stipes mostly hollow in part, smooth. *Sow.* Fung. t. 103. *Pers.* Syn. t. 430. *Fries*, Syst. Mycol. v. 1. p. 63. *Ag. piperatus*, *Hook.* Fl. Scot. 2. p. 20.

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. *Lamellæ* 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 Linnæus.

12. Ag. *Celicioides*, pileus tomentose, dingy pale reddish, or salmon-colour; lamellæ yellowish, stipes robust, partly hollow. *Fries.* Syst. Mycol. v. 1. p. 63. *Ag. necator*, v. 2. *With.* Bot. Arr. ed. 6. v. iv. p. 227.?

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. *Lamellæ* 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.)

13. Ag. *deliciosus*, pileus glutinous, obscurely zoned, dingy orange or reddish, very pale when dried; lamellæ and juice orange; stipes becoming hollow, glabrous. *Sow.* Fung. t. 202. *Pers.* Syn. Fung. p. 432. *Fries*, Syst. Mycol. v. 1. p. 67.

HAB. In woods, especially among fir-trees, and in shaded places. July to November. Ravelston wood, Withering. Hallyards, Messrs Wauch and Greville.

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. *Lamellæ* 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.)

14. Ag. *subdulcis*, pileus glabrous, polished, reddish; lamellæ flesh-coloured, at length ferruginous; juice white, not changing colour; stipes firm, smooth, becoming hollow. *Pers.* Syn. Fung. p. 433. *Fries*, Syst. Mycol. v. 1. p. 70. *Ag. lactifluus*, *Sow.* t. 204. *Hook.* Fl. Scot. 2. p. 19.

HAB. In woods, extremely common. Swanston wood. Dundas Hill, &c. Summer and autumn.

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. *Lamellæ* 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.

15. Ag. *plumbeus*, pileus large, dry, zoneless, dark fuscous or deep dingy grey; lamellæ yellowish, rather numerous; juice white. *Pers.* Syn. Fung. p. 435. *Fries*, Syst. Mycol. v. 1. p. 73. *Ag. Listeri*, *Sow.* Fung. t. 245.

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. *Lamellæ* numerous, yellowish, varying

with different shades. *Stipes* 2–3 inches long, firm, thick, brownish or dingy olive.

16. Ag. *piperatus*, pileus depressed, becoming infundibuliform, glabrous, whitish; lamellæ very narrow, crowded; stipes solid, white, thick; juice white, very acrid. *Pers.* Syn. Fung. p. 429. *Fries*, Syst. Mycol. v. 1. p. 76.

HAB. Woods, borders of fields, &c. Autumn. Dundas Hill, and at Balmuto.

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 acrid and bitter. It is nevertheless eatable, according to Fries.

This plant is sometimes monstrous, and irregular; Withering mentions their attaining the diameter of 10 inches. The stipes is not unfrequently 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.*

17. Ag. *giganteus*, very large, whitish or very pale brown; pileus becoming infundibuliform; lamellæ numerous, decurrent, becoming reddish; stipes solid, very thick. *Sow.* Fung. t. 244. *Fries*, Syst. Mycol. v. 1. p. 80.

HAB. Meadows and pastures. Newliston, Captain Wauch. Autumn.

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.

18. Ag. *gilvus*, large, pileus convex, umbonate, at length infundibuliform, smooth, firm, yellowish-white; lamellæ numerous, decurrent, whitish; stipes straight, solid, subradicating. *Pers.* Syn. Fung. p. 448. *Fries*, Syst. Mycol. v. 1. p. 80. *Ag. pileolarius*, *Sow.* Fung. t. 61.

HAB. Woods, especially among beech-trees. Autumn. Newliston woods, Messrs Wauch and Greville.

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, ½–¾ of an inch thick, cylindrical, firm, somewhat incras-

sated at the base, solid, the same colour as the pileus, subradicating, (penetrating somewhat into the ground).

19. Ag. *odorus*, fragrant, smooth, dull, blueish-green, umbonate, convex, becoming plane; lamellæ numerous, adnato-decurrent. *Grev.* Crypt. Fl. t. 28. *Sow.* Fung. t. 42. *Pers.* Syn. Fung. p. 323. *Fries*, Syst. Mycol. v. 1. p. 90.

HAB. In moist woods, among dead leaves. Foxhall, Hallyards and Newliston woods, Captain Wauch. 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. *Lamellæ* 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; lamellæ adnate, numerous; stipes solid, equal, glabrous.

Var. γ. pileus repand, lobed, umbonate, stipes short, slender. *Sow.* Fung. t. 123. *Fries*, Syst. Mycol. v. 1. p. 92.

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, 1–½ inches broad, white. *Lamellæ* narrow, irregular, white. *Stipes* short, crooked or straight, rather tough, smooth, white.—Subgregarious, polymorphous.

** *Pileus dry. Lamellæ very distant, arched, decurrent.*

21. Ag. *pratensis*, firm; pileus compact, convex, becoming partially expanded, smooth, brownish buff with a pink tinge; lamellæ decurrent, thick; stipes short, solid, attenuated below. *Pers.* Syn. Fung. p. 304. *Fries*, Syst. Mycol. p. 99. *Ag. fulvosus*, *Bolt.* Fung. t. 56. *(very bad).* *Ag. miniatus*, *Sow.* Fung. t. 141. (*good*).

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. *Lamellæ* 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. Lamellæ various. Stipes hollow.* (Mild, but not eaten).

22. Ag. *psittacinus*, green, changing to yellow; pileus campanulate, spreading; lamellæ adnate, rather distant; stipes equal, smooth. *Grev.* Crypt. Fl. t. 74. *Sow.* Fung. t. 82. *Pers.* Syn. Fung. p. 335. *Fries.* Syst. Mycol. v. 1. p. 102.

HAB. Pastures, meadows. King's Park, very common. Summer and autumn.

Pileus about 1 inch in breadth, conical, at length spreading, rarely concave from the margin turning up, smooth, glutinous, green at first, partly changing to yellow, of various intensity, often cracking. *Lamellæ* slightly adnate, bright yellow, often shadowed with green, subdistant, thick, broad in the centre. *Stipes* hollow, splitting, green, yellow at the base, very viscous, 2–3 inches high, about 2 lines thick.

23. Ag. *ceraceus*, pileus nearly plane, slimy, substriate, yellow; lamellæ adnato-decurrent, distant; stipes rather unequal, gradually attenuated towards the base. *Sow.* Fung. t. 20. *Pers.* Syn. Fung. p. 337. *Hook.* Fl. Scot. 2. p. 23. *Fries.* Syst. Mycol. v. 1. p. 102.

HAB. Meadows and pastures, autumn. About Edinburgh, rare.

Pileus plano-convex, nearly 1 inch in breadth, yellow, shining, dry and sometimes concave in age. *Lamellæ* rather broad, distant, yellow, decurrent. *Stipes* rather slender, 2–3 inches long, hollow, often compressed, yellow, attenuated at the base.—Plant subgregarious.

24. Ag. *conicus*, pileus conical, glutinous, mostly yellow or crimson; lamellæ crowded, ventricose, attenuated and free; stipes substriate, splitting. *Pers.* Syn. Fung. p. 335. *Fries.* Syst. Mycol. v. 1. p. 103. *Ag. aurantius*, *Sow.* Fung. t. 381. *Hook.* Fl. Scot. 2. p. 22.

HAB. Meadows, pastures, grassy moors, &c., very common in summer and autumn. King's Park and elsewhere around Edinburgh, abundant.

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. *Lamellæ* 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. Lamellæ usually arched and decurrent.*

25. Ag. *laccatus*, gregarious, pileus scarcely fleshy, tough, farinaceous with minute scales, pale or deep flesh colour, disk depressed in age; lamellæ distant; stipes long, elastic. *Fries.* Syst. Mycol. v. 1. p. 107. *Ag. farinaceus*, *Sow.* Fung. t. 208. *Pers.* Syn. Fung. p. 453. *Hook.* Fl. Scot. 2. p. 22.

HAB. In moist woods, and in pastures under trees, very abundant. Dundas Hill. Newliston woods. Abercorn Park, Duddingston. Balmuto, &c.

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 rol-

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.

26. Ag. *amethystinus*, pileus convex, becoming depressed, somewhat squamulose, purple; lamellæ distant, thick, violet-purple; stipes purple, hollow when old. *Sow.* Fung. t. 187. *Pers.* Syn. Fung. p. 465. *Hook.* Fl. Scot. 2. p. 20.

HAB. In woods. Dundas Hill, and probably common elsewhere about Edinburgh. Autumn.

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.*

27. Ag. *compressus*, pileus subcarnose, irregular, smooth, thin, fuscous; lamellæ distant, white; stipes hollow, whitish, compressed. *Sow.* Fung. t. 66. *Pers.* Syn. Fung. p. 363. *Fries*, Syst. Mycol. v. 1. p. 115.

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, pellucid, 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, ¼–½ 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.*

28. Ag. *radicatus*, pileus rugose, glutinous, tough; lamellæ white; stipes tall, rigid, with a long fusiform root. *Sow.* Fung. t. 48. *Pers.* Syn. Fung. p. 313. *Fries.* Syst. Mycol. v. 1. p. 118.

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, viscous, rugose, tough, elastic, broadly conical, at length plane, umbonate. *Lamellæ* 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

and reddish brown, or blackish towards the base. *Sow.* Fung. t. 263. and 384. f. 3. *Pers.* Syn. Fung. p. 314. *Fries*, Syst. Mycol. v. 1. p. 119.

HAB. 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. *Lamellæ* numerous, white, at length yellow, unequal, some slightly adnate, others free, truncate. *Stipes* incurved, unequal, hollow, 2–9 inches long, near ⅜ of an inch in diameter, pale above, below reddish-brown or blackish, and villose or velvety.

******* *Pileus tender, not glutinous. Lamellæ free, numerous, white. Stipes thicker at the base.*

30. Ag. *dryophyllus*, variable; pileus thin, watery, smooth, plane, sometimes depressed; lamellæ free, soft; stipes hollow, splitting, becoming thicker towards the base, pinkish or yellowish-white, more coloured at the summit. *Sow.* Fung. t. 127. *Pers.* Syn. Fung. p. 452. *Fries*, Syst. Mycol. v. 1. p. 124. *Hook.* Fl. Scot. 2. p. 24.

HAB. Woods, pastures and meadows, from May to October, frequent. Balmuto. Braid Hermitage. Craiglockhart, &c.

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. *Lamellæ* free, white, or very pale flesh-colour, soft, tender, entire or serrate, numerous. *Stipes* hollow, 2–3 inches long, about ¼–⅓ 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. Lamellæ free, distant, pale.*

31. Ag. *peronatus*, pileus dry, leathery, convex, at length nearly plane; lamellæ distant, pale reddish or buffish; stipes solid, clothed towards the base with a woolly or strigose mass. *Sow.* Fung. t. 37. *Pers.* Syn. Fung. p. 331. *Fries*, Syst. Mycol. v. 1. p. 126.

HAB. In oak woods among rotten leaves. Autumn. Foxhall, Captain Wauch. 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. *Lamellæ* 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. *orcades*, pileus tough, subumbonate, reddish, becoming buffish or very pale, opake; lamellæ distant, whitish;

stipes solid, firm, cylindrical, thickest under the pileus, pale. *Fries*, Syst. Mycol. v. 1. p. 127. *Hook.* Fl. Scot. 2. p. 21. *Ag. pratensis*, *Sow.* Fung. t. 247. *(not good.)*

HAB. In meadows and pastures, frequent. May to November. Caroline 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.)* *Lamellæ* 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 lamellæ, 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 OMPHALIA, *Pers.*)

Stipes hollow, often, however, so slender, that a line is all that is visible, equal, firm, cylindrical, often radicating. Pileus carnoso-membranaceous, not brittle, convex, at length plane, often depressed in the centre, smooth, not glutinous. Lamellæ 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. Lamellæ distinct from the pileus. Stipes white or pale reddish.*

33. Ag. *tuberosus*, pileus plane or somewhat umbonate; lamellæ adnate, numerous; stipes subfistulose, slightly tomentose at the base, and springing from a reddish tuberous root. *Grev.* Crypt. Fl. t. 23. *Pers.* Syn. Fung. p. 374. *Fries*, Syst. Mycol. v. 1. p. 133.

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* ¼–¾ of an inch broad, plane, smooth, rarely subumbonated, white, or tinged with brown, thin, dry. *Lamellæ* very numerous, white, adnate, narrow. *Stipes* ½–2 inches high, slender, subfistulose, smooth, white, often curved towards the base, and springing from a chesnut-coloured tuber.

34. Ag. *clavus*, pileus plano-convex, reddish orange; lamellæ white, rather broad, fixed; stipes very slender, subsolid, whitish. *Pers.* Syn. Fung. p. 392. *Hook.* Fl. Scot. 2. p. 21. *Fries*, Syst. Mycol. v. 1. p. 134.

HAB. On dead sticks, &c. among leaves and moss. Autumn. Balmuto. Craiglockhart woods, and elsewhere, but not common.

Plants minute, subgregarious. *Pileus* about 2 lines broad, slightly umbilicate, delicate, convex, thin. *Lamellæ* 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.

35. Ag. *ramealis*, gregarious; pileus nearly plane, white, sometimes changing to reddish; lamellæ adnate, white; stipes short, minutely furfuraceous, marked within with a white line. *Pers.* Syn. Fung. p. 375. *Fries*, Syst. Mycol. v. 1. p. 135.

HAB. 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. *Lamellæ* subdistant, narrow, white. *Stipes* short, ½–¾ of an inch high, half a line thick, rather firm, whitish or reddish white, minutely squamulose.

** *Pileus mostly plicate. Lamellæ and pileus homogeneous. Stipes subcorneous, of a dark colour.*

36. Ag. *Rotula*, pileus convex, umbilicate, plicate; lamellæ attached to a collar surrounding the stipes, white; stipes hollow, striate, black below. *Sow.* Fung. t. 95. *Pers.* Syn. Fung. p. 467. *Fries*, Syst. Mycol. v. 1. p. 136. *Merulius collariatus*, *Hook.* Fl. Scot. 2. p. 25.

HAB. 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. *Lamellæ* 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.

37. Ag. *androsaceus*, pileus convex, plicate, white, sometimes tinged with brown; lamellæ simple, adnate, white; stipes hollow, furrowed, very glabrous, purplish brown or black, except at the summit. *Sow.* Fung. t. 93. *Fries*, Syst. Mycol. v. 1. p. 139. *Merulius androsaceus*, *Hook.* Fl. Scot. 2. p. 25.

HAB. 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. *Lamellæ* 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.

38. Ag. *epiphyllus*, pileus nearly plane, rugose; lamellæ few, adnate, resembling white prominent veins; stipes hollow, very minutely velvety, reddish-brown below. *Pers.* Syn. Fung. p. 468. *Fries*, Syst. Mycol. v. 1. p. 139. *Ag. squamula*, *Sow.* Fung. t. 93. *Merulius squamula*, *Hook.* Fl. Scot. 2. p. 25.

HAB. 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. *Lamellæ* 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.

39. Ag. *fætidus*, pileus convex, umbilicated, plicate, reddish-brown; lamellæ adnate, pale yellowish; stipes hollow, reddish-brown, velvety. *Fries*, Syst. Mycol. v. 1. p. 138. *Merulius fætidus*, *Sow.* Fung. t. 21.

HAB. On dead branches of trees in woods. Autumn. Foxhall, Captain Wauch.

Plant gregarious. *Pileus* convex, rarely quite plane, plicate, reddish-brown, ¼–¾ of an inch broad, thin, glabrous. *Lamellæ* adnate, narrow, yellowish, distant. *Stipes* about an inch long, thin, dark brown, minutely velvety or hairy.—Smell disagreeable.

SECT. 8. (MYCENA, *Pers.*)

Stipes with a fine hollow, slender, subcartilaginous, separating from the pileus, villose at the base, and mostly radicating, never bulbous. Pileus membranaceous, conical, at length campanulate, rarely more expanded, substriate, smooth, more or less transparent. Lamellæ unequal, ascending, and attenuated towards the stipes. Sporules white. Colour various.—Rather small fungi, of little substance, slender, not evanescent, generally gregarious or tufted, often with a strong smell. None are edible.

* *Pileus more or less brown. Stipes smooth.*

40. Ag. *alliaceus*, stinking; pileus becoming nearly plane, subcoriaceous; lamellæ free, whitish; stipes tall, covered with a sort of bloom, dark purplish, brown below, velvety at the base. *Sow.* Fung. t. 81. *Pers.* Syn. Fung. p. 375. (in part). *Fries*, Syst. Mycol. v. 1. p. 140. *Hook.* Fl. Scot. 2. p. 23. *Ag. porreus*, *Pers.* Syn. Fung. p. 376. (excluding Syn. *Bull.*) *Pers.* Syst. Mycol. v. 1. p. 128. (in part.)

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. *Lamellæ* 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 lamellæ 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 lamellæ distant.

41. Ag. *galericulatus*, scentless, pileus brownish; lamellæ whitish, adnate, with a decurrent process; stipes smooth, tenacious, strigose at the base, and radicating. *Sow.* Fung. t. 165. *Pers.* Syn. Fung. p. 376. *Fries*, Syst. Mycol. v. 1. p. 143.

HAB. By the sides of rotten stumps of trees, and among grass and moss, extremely common. Autumn.

Plant very variable, scentless, insipid, tenacious, gregarious or solitary. *Pileus* more or less membranaceous, campanulate or conical, subrugose, more or less striate, ¼–¾ of an inch in diameter, various shades of dilute brown, sometimes brownish-white. *Lamellæ* subdistant, whitish, rather narrow, adnate. *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.*

42. Ag. *polygrammus*, pileus obscurely striate, blueish-grey; lamellæ attenuated and subadnate, whitish; stipes long, rigid, striate, glistening. *Pers.* Syn. Fung. p. 377. *Sow.* Fung. t. 222. *Fries*, Syst. Mycol. v. 1. p. 146.

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 umbonate, ½–1 inch broad, striate, tenacious, cinerous or blueish-grey. *Lamellæ* 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.*

43. Ag. *strobilinus*, bright red; pileus acutely umbonate, with a striate margin; lamellæ fixed, dilute, reddish; stipes firm, strigose and pale at the base. *Pers.* Syn. Fung. p. 393. *Fries*, Syst. Mycol. v. 1. p. 150. *Ag. coccineus*, *Sow.* Fung. t. 197.

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. *Lamellæ* 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.

44. Ag. *roseus*, pileus between fleshy and membranaceous, convex, pale, rose-purple; lamellæ ventricose, rather paler than the pileus; stipes smooth, villose at the base. *Sow.* Fung. t. 72. *Ag. purus*, *Pers.* Syn. Fung. p. 339. *Fries*, Syst. Mycol. v. 1. p. 151.

HAB. In shaded woods, frequent. Balmuto. Abercorn Park, Duddingston. Autumn.

Scattered, solitary or subgregarious. *Pileus* ½–2 inches broad, convex, obtuse, smooth, very delicate, dilute rose-colour. *Lamellæ* 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. Lamellæ adnate or decurrent, unequal, juiceless. Sporidia white. Colour various.

* *Small. Pileus submembranaceous. Lamellæ decurrent.*

45. Ag. *fibula*, pileus convex, glabrous, orange-yellow; lamellæ whitish, distant; stipes yellowish. *Sow.* Fung. t. 45. *Pers.* Syn. Fung. p. 471. *Fries*, Syst. Mycol. v. 1. p. 164. *Ag. parvus*, *Hook.* Fl. Scot. 2. p. 22.

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. *Lamellæ* broad, distinct, very decurrent, orange. *Stipes* solid in the young plant, at length hollow, ½–1 inch long, very slender, pale orange.

46. Ag. *muralis*, pileus convex, umbilicated, striate; lamellæ broad, pale; stipes solid, short, thickish. *Sow.* Fung. p. 322. *Fries*, Syst. Mycol. v. 1. p. 165.

HAB. On walls capped with turf, and in pastures. Autumn. About Edinburgh.

Plant gregarious. *Pileus* convex, umbilicated, ⅓–1 inch broad, reddish-brown, striate, margin often turned up in age. *Lamellæ* broad, pale whitish-brown, distant, decurrent. *Stipes* short, ¼–½ of an inch high, thickish, usually subincurved, pale brown, solid.

47 Ag. *cricetorum*, pileus depressed in the centre, margin turned down, striate; lamellæ distant, rather broad, white; stipes short, pubescent at the base. *Pers.* Syn. Fung. p. 472. *Fries*, Syst. Mycol. v. 1. p. 165.

HAB. On the ground, in sandy and heathy places. May to November. Pentland Hills.

Plant subgregarious. *Pileus* ½–1 inch broad, depressed in the centre, margin deflexed, and sometimes waved, striate, whitish, whitish-brown or yellow, darker when moist. *Lamellæ* broad towards the stipes, whitish, decurrent. *Stipes* ½–1 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. Lamellæ not decurrent.*

48. Ag. *fragrans*, odorous; pileus nearly plane, pale yellowish or brownish-white when dry; lamellæ numerous, whitish; stipes hollow, white. *Sow.* Fung. t. 10. *Pers.* Syn. Fung. p. 455. *Fries*, Syst. Mycol. v. 1. p. 171.

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.

Pileus 1–2 inches broad, plane, sometimes slightly depressed in the centre, subflaccid, smooth, striate at the margin when moist, colour pale, livid-yellowish or brownish; "stone-colour" *(With)*. *Lamellæ*, rather numerous, white. *Stipes* 2–3 inches high, 2–3 lines thick, solid, fibrous, whitish, somewhat attenuated upwards.

49. Ag. *cyathiformis*, pileus somewhat fleshy, funnel-shaped, smooth, dark brown grey, margin reflexed; lamellæ distant, greyish; stipes elastic, attenuated above. *Fries*, Syst. Mycol. v. 1. p. 173. *Ag. sordidus*, *Dicks.* *Sow.* Fung. t. 363. *Ag. tardus*, *Pers.* Syn. Fung. p. 461.

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. *Lamellæ* 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. Lamellæ 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 umbilicated. Lamellæ 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; lamellæ ventricose. *Ditm.* in *Sturm's* Fung. t. 15. *Fries*, Syst. Mycol. v. 1. p. 200.

HAB. On rotten wood, saw-dust, &c. July—October, rare. In a saw-pit at Foxhall, Messrs Wauch and Greville.

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. *Lamellæ* 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, *Frics.*—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. Lamellæ subobtuse next the stipes, fixed or free, never decurrent, rather broad, at length rose-coloured. Colour cæruleous or grey.—Small, durable, scentless, insipid fungi. Not used as food.

51. Ag. *chalybeus*, pileus somewhat squamose, blue; lamellæ blueish-white, adnate, at length purple; stipes solid, smooth, blueish. *Pers.* Syn. Fung. p. 343. *Frics*, Syst. Mycol. v. 1. p. 203. *Ag. columbarius*, *Sow.* Fung. t. 161.

HAB. Pastures, very common. July to September.

Pileus campanulate, obtuse, slightly scaly, ½–1 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 viscous, regular. Substance succulent. Lamellæ adnate, broad, changing colour. Sporules copious. Colour of the pileus and the lamellæ more or less violet.—Rather large fungi, firm, subsucculent, growing on the ground. None but Ag. violaceus have been tried as food.

52. Ag. *violaceus*, pileus very convex, dull or brownish-violet; lamellæ distant, violet; stipes spongy, greyish-violet within. *Sow.* Fung. t. 209. *Hook.* Fl. Scot. 2. p. 20. *Fries*, Syst. Mycol. v. 1. p. 217. *Ag. hercynicus*, *Pers.* Syn. p. 278.

HAB. In woods. Autumn. Balmuto. Dundas Hill, and elsewhere, frequent.

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, ½–¾ of an inch in diameter, bulbous, solid, spongy, flesh tinged with violet.

53. Ag. *glaucopus*, compact, rounded; pileus olivaceous, or brownish-grey, glutinous while young; lamellæ reddish-brown, tinged with violet; stipes thick, tinged with violet. *Sow.* Fung. t. 223. *Pers.* Syn. Fung. p. 282. *Fries*, Syst. Mycol. v. 1. p. 225.

HAB. In woods, Balmuto. 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 umbonate, fibrillose. Lamellæ unequal, broadish, numerous. Colour various.—Medium or small fungi remaining a long time; not eaten.

54. Ag. *cinnamomeus*, pileus glabrous, subcarnose, obtusely umbonate, cinnamon colour; lamellæ numerous, adnate, yellow-cinnamon; stipes yellowish, rarely straight. *Sow.* Fung.

t. 206. *Pers.* Syn. Fung. p. 297. *Hook.* Fl. Scot. 2. p. 22. *Fries*, Syst. Mycol. v. 1. p. 229. *Ag. croceus*, *Pers.* Syn. p. 297.

HAB. In woods, frequent. Newliston woods; Dundas Hill; Carlowrie, &c.

Pileus convex, or even obtusely conical when very young, becoming nearly plane, obtusely umbonate, 1–2½ broad, deep reddish cinnamon colour, often cracking at the margin, which is thin and sometimes fibrillose, smooth, somewhat fleshy. *Flesh* yellowish. *Lamellæ* numerous, adnate, yellow cinnamon, broad, margin often notched. *Stipes* 2–3 inches long, 2–4 lines thick, equal, fibrillose, yellow, solid, hollow in old large plants?

55. Ag. *helvolus*, pileus pale reddish-buff, umbonate, subfarinaceous; lamellæ cinnamon colour, broad, numerous; stipes whitish, often with a few remains of the veil attached. *Pers.* Syn. Fung. p. 273. *Ag. hinnuleus*, *Sow.* Fung. t. 173. *Hook.* Fl. Scot. 2. p. 21.

HAB. In woods, borders of fields, &c. Autumn. Swanston woods, among beech and pine trees.

Pileus plano-convex, bluntly umbonate, 1–3 inches broad, farinaceous, cinnamon-buff colour, the farinaceous matter whitish, margin thin, uneven. *Lamellæ* 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. Lamellæ changing colour: Sporules ferruginous.* (DERMINUS, *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. Lamellæ unequal, juiceless, changing colour. Sporules ferruginous.

56. Ag. *floccosus*, tufted; pileus fleshy, brownish or reddish-yellow, scaly with fasciculated filaments; scales revolute; stipes squarrose with scales. *Grev.* Crypt. Fl. t. 2. *Sow.* Fung. t. 284. *Ag. squarrosus*, *Pers.* Syn. Fung. p. 268. *Fries*, Syst. Mycol. v. 1. p. 243.

HAB. On rotten stumps of felled trees, common. Carlowrie. Balmuto. Aberdour. Duddingston, &c. Autumn.

Plant tufted, tufts sometimes very large. *Pileus* 2–5 inches broad, more or less convex, obtusely umbonate, covered with revolute brown scales. *Lamellæ* 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; lamellæ subdecurrent, numerous, reddish-brown; stipes hollow, subin-

curved. *Fries*, Syst. Mycol. v. 1. p. 245. *Ag. Xylophyllus*, *Sow.* Fung. t. 167. (good). *Ag. caudicinus*, *Pers.* Syn. p. 271.

HAB. On trunks of trees, rotten wood, and on the ground. May to November. Craiglockhart. Newliston woods.

Pileus nearly plane, subumbonate, smooth, rarely squamulose, nut-brown and striate when moist, becoming pale in drying. *Lamellæ* numerous, dull reddish-brown, rather broad, slightly decurrent. *Stipes* 1½–3 inches long, about 2 lines thick, hollow, subincurved, rarely straight, whitish-brown. *Veil* distinctly annular, but fugacious.

B. *Veil very fugacious* or *simply marginal.*

SECT. 2. (INOCYBE., *Frics.*—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. Lamellæ free, or nearly so, appearing adnate afterwards, 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.

58. Ag. *scaber*, pileus fleshy, obtuse, scaly, brownish-grey; lamellæ free, or nearly so; stipes solid, fibrillose. *Sow.* Fung. t. 207. *Pers.* Syn. Fung. p. 301. *Fries*, Syst. Mycol. v. 1. p. 225.

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. *Lamellæ* 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.

59. Ag. *rimosus*, pileus dry, campanulate, at length nearly plane, surface splitting longitudinally, pale shining brown; stipes solid, somewhat tuberous at the base. *Sow.* Fung. t. 323. *Pers.* Syn. Fung. p. 310.

HAB. Woods, waste places, &c. June to September. Abercorn Park, Duddingston.

Pileus 1–2½ inches broad, campanulate, becoming plano-convex, umbonate, pale sattiny 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.

60. Ag. *geophyllus*, pileus conical, at length expanded, umbonate, silky; lamellæ subadnate; stipes solid, slender, sprinkled with white pulverulent particles. *Sow.* Fung. t. 142. *Pers.* Syn. Fung. p. 340. *Fries*, Syst. Mycol. v. 1. p. 258.

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, ½–1 inch broad, whitish, brown, or even violet, often cracking at the margin and on the surface of the pileus. *Lamellæ* reddish-brown, often tinged with violet, rather broad, not numerous. *Stipes* 1–3 inches long, firm, solid, fibrillose, 1–2 lines thick, crooked, equal.

SECT. 3. (GALERA, *Fries.*—Part of MYCENA, *Pers.*)

Veil floccose, very fugacious, but certainly present. Stipes hollow, slender, separating from the pileus, rarely naked, but mostly covered with a sort of bloom or fibrillæ. Pileus membranaceous, conical, afterwards campanulate, rarely more expanded, substriate when moist, becoming paler when dry, wholly without scales or superficial fibres. Lamellæ either touching the stipes or adnate. Colour mostly reddish-buff.—Slender, fragile fungi, mostly on moist ground. No smell, and useless.

61. Ag. *tener*, pileus obtusely conical, striate when moist, when dry smooth, ochraceous; lamellæ adnate, linear; stipes long, glabrous, fragile. *Sow.* Fung. t. 33. *Pers.* Syn. Fung. p. 386. *Hook.* Fl. Scot. 2. p. 22. *Fries*, Syst. Mycol. v. 1. p. 265.

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. *Lamellæ* 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.

62. Ag. *Hypnorum*, minute; pileus campanulate, striate when moist, reddish-buff, becoming pale; lamellæ adnate, rather broad, distant; stipes somewhat crooked, filiform. *Pers.* Syn. Fung. p. 385. *Fries*, Syst. Mycol. v. 1. p. 267. *Ag. acicula*, *Sow.* Fung. t. 282.

HAB. On the ground, among moss. Autumn. Foxhall, Captain Wauch.

Pileus reddish, brownish, buffish-red, &c., very small, not ¼th of an inch in diameter, conical, at length campanulate, striato-sulcate when moist, membranaceous. *Lamellæ* 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. γ and δ, 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. Lamellæ adnato-decurrent, numerous.—Persistent fungi, mostly on the ground; not edible.

63. Ag. *involutus*, compact; pileus depressed, ochrey-brown, with a tomentose involute margin; lamellæ mostly dichotomous;

stipes thick, often excentrical. *Pers.* Syn. Fung. p. 448. *Fries*, Syst. Mycol. v. 1. p. 271. *Ag. contiguus*, *Sow.* Fung. t. 98.

HAB. On the ground in woods; frequently on turf-walls and banks. Autumn. Foxhall, Captain Wauch. Balmuto. Newliston woods, &c.

Pileus 2–3 inches broad, depressed in the centre, margin much rounded, involute and villose, yellowish or ochrey-brown, very smooth when dry. *Lamellæ* 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. Lamellæ 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 fibrillæ. Lamellæ free or fixed, broad, becoming dark.—Some are edible. Traces of a nearly general veil are seen in Ag. campestris, Georgii *and* æruginosus.

64. Ag. *campestris*, pileus white, fleshy, dry, subsquamose or sericeous; lamellæ free, ventricose, pink, changing to dark fuscous; stipes solid, white, with an annular veil. *Sow.* Fung. t. 305. *Pers.* Syn. Fung. p. 418. *Hook.* Fl. Scot. 2. p. 21. *Fries*, Syst. Mycol. v. 1. p. 281.

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, subsquamose or nearly smooth. *Flesh* white. *Lamellæ* 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.

65. Ag. *Georgii*, pileus very fleshy, convex, white or pale yellowish, mostly smooth; lamellæ broad, whitish, at length deep purple-brown; stipes thick, with a persistent collar. *Sow.* Fung. t. 304. *Hook.* Fl. Scot. 2. p. 21.

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. *Lamellæ* numerous, white, or very pale flesh colour, changing at length to deep purplish-brown, broad, free. *Stipes* 2–5 inches long, ¾–1 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 lamellæ 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.

66. Ag. *semiglobatus*, pileus hemispherical, smooth, glutinous, reddish-yellow; lamellæ adnate, mostly horizontal, darkly mottled; stipes hollow, crooked, firm, glabrous. *Sow.* Fung. t. 248. *Pers.* Syn. Fung. p. 407. *Hook.* Fl. Scot. 2. p. 23. *Ag. virosus*, *Sow.* Fung. t. 407. & 408.

HAB. Pastures, meadows, and grassy woods. Extremely common. May to November.

Pileus ½–1½ inches diameter, hemispherical, rarely in large specimens becoming plano-convex, yellow, or reddish-orange, very slimy, smooth. *Lamellæ* 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 annular veil.

67. Ag. *æruginosus*, pileus fleshy, yellow, but being covered with a blue slime, appearing greenish; lamellæ adnate, purple-brown; stipes hollow, squamose. *Sow.* Fung. p. 264. *Pers.* Syn. Fung. p. 419. *Fries*, Syst. Mycol. v. 1. p. 286.

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. *Lamellæ* rather numerous, purplish-brown, adnate, broad. *Stipes* 2–3 inches long, 3–6 lines thick, whitish, verdigris-green, hollow, furnished with a subpersistent 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 PRATELLA, *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. Lamellæ adnate, numerous, becoming more or less moist. —Tufted fungi, growing mostly from rotten stumps.

68. Ag. *lacrymabundus*, pileus fleshy, very fibrous, pale yellow-brown; lamellæ dull reddish-brown, exuding a thin grey fluid; stipes hollow, fibrillose, thickest at the base. *Sow.* Fung. t. 41. *Hook.* Fl. Scot. 2. p. 23. *Fries*, Syst. Mycol. v. 1. p. 287. *Ag. velutinus*, *Pers.* Syn. Fung. p. 409.

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*

mellæ 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.

69. Ag. *fascicularis*, pileus somewhat fleshy, umbonate, ochraceous, or reddish-orange; lamellæ greenish, numerous; stipes hollow, rather slender, long. *Sow.* Fung. t. 285. *Pers.* Syn. Fung. p. 421. *Fries*, Syst. Mycol. v. 1. p. 288.

HAB. On rotton stumps of trees, or near trees. May to November. Very common about Edinburgh.

Tufted. *Pileus* 1½–2 inches broad, plano-convex, umbonate, yellowish, reddish-buff or brownish-orange, smooth, margin thin. *Lamellæ* adnate, numerous, rather narrow, pale yellowish, at length greenish, mottled. *Stipes* 2–9 inches long, about 2 lines thick, equal, hollow, yellowish. *Veil* very fugacious, scarcely leaving a permanent trace upon the stipes. *Taste* extremely bitter.

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.

70. Ag. *lateritius*, pileus fleshy, obtuse, brown-orange, lamellæ slightly greenish; stipes filled with a spongy mass, stained by the veil. *Pers.* Syn. Fung. p. 421. *Fries*, Syst. Mycol. v. 1. p. 288.

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.

Tufted. *Pileus* fleshy, brown-orange, paler at the margin, when young sericeous, 2–5 inches broad, convex, sometimes glutinous, rarely scaly. *Lamellæ* adnate, rather broad, pale, greyish, at length somewhat greenish, numerous. *Stipes* 2–5 inches long, about ⅓d of an inch thick, firm, cylindrical, crooked, scarcely quite solid, but filled with a fibrous spongy mass. *Flesh* yellowish-white. *Veil* fugacious, staining the stipes more or less. *Taste* bitter.

SECT. 3. (COPRINARIUS, *Fries.*—Part of COPRINUS and PRATELLA, *Pers.*)

Veil attached to the margin, rarely annular, mostly very fugacious. Stipes hollow, slender, subfragile, separating from the pileus. Pileus slightly fleshy or membranaceous, smooth, subpersistent. Lamellæ subdeliquescing. Sporules black.

71. Ag. *semiovatus*, pileus somewhat fleshy, obtusely campanulate, glutinous, yellowish or brownish white; lamellæ adnate, greyish-black; stipes long, white; veil annular, entire. *Sow.* Fung. t. 131. *Pers.* Syn. Fung. p. 408. *Hook.* Fl. Scot. 2. p. 25. *Fries*, Syst. Mycol. v. 1. p. 300.

HAB. On dung in pastures, from spring to autumn; very common.

Pileus campanulate, but very obtuse at the summit, ½–1¼ inches from the base to the apex, not expanding at the base without cracking, yellowish-white, glutinous, smooth, polished, "wrinkled when old like wash-leather," (*With.*) *Lamellæ* 2–3 lines broad, vanishing towards the margin of the pileus, very dark grey, numerous. *Stipes* 3–6 inches high, white

hollow, rather firm, 2–3 lines thick, shining, somewhat bulbous, sprinkled with the dark sporules. *Veil* rather fugacious.

72. Ag. *titubans*, pileus membranaceous, plicate, viscous, yellow; lamellæ scarcely attached to the stipes, pale purplish, at length brown flesh-colour; stipes equal, shining. *Sow.* Fung. t. 128. *Pers.* Syn. Fung. p. 415. *Fries*, Syst. Mycol. v. 1. p. 304.

HAB. On horse and cow dung. Autumn. Foxhall, Captain Wauch. Carlowrie.

Pileus conical, at length plane, ½–¾ of an inch broad, membranaceous, plicate, pale yellow, deepest in the centre, and smooth. *Lamellæ* 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.

73. Ag. *disseminatus*, gregarious, small, pileus ovato-campanulate, plicate; lamellæ subadnate, whitish, at length grey; stipes incurved, glabrous. *Pers.* Syn. Fung. p. 403. *Fries*, Syst. Mycol. v. 1. p. 205. *Ag. striatus*, *Sow.* Fung. t. 166.

HAB. On decaying trunks, and rotten stumps of felled trees, extremely common. Spring to autumn.

Crowded. *Pileus* ovate, conical, at length campanulate, ⅛–½ an inch from the base to the apex, striated and plicate, membranaceous, pale buff or reddish-brown, at length grey, becoming flaccid and dissolving. *Lamellæ* 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. *Lamellæ free, dissolving along with the pileus. Veil general. Sporules black.* (COPRINUS, *Pers.*)

Stipes hollow, straight, fragile, subsquamose, 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. Lamellæ 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.

74. Ag. *comatus*, pileus somewhat fleshy, white, scaly; lamellæ white, changing to red-purple and to black; stipes subbulbous; veil annular, moveable. *Pers.* Syn. Fung. p. 395. *Fries*, Syst. Mycol. v. 1. p. 307. *Ag. cylindricus*, *Sow.* Fung. t. 189.

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. *Lamellæ* crowded, contiguous, broad, white, changing to a pink-brown and black free. *Stipes* white, hollow, fibrous within, cylindrical, bulbous.

75. Ag. *atramentarius*, tufted; pileus somewhat fleshy, grey, becoming reddish-brown, smooth, scaly at the apex; lamellæ ventricose, white, changing to purplish-brown; stipes equal, naked. *Fries*, Syst. Mycol. v. 1. p. 309. *Ag. fimetarius*, *Sow.* Fung. t. 188. *Ag. plicatus*, *Pers.* Syn. Fung. p. 396.

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. *Lamellæ* free, silvery, grey, changing to black, contiguous to each other, ventricose, dissolving in age. *Stipes* hollow, white, 3–8 inches long, cylindrical, about ½d 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.

76. Ag. *micaceus*, tufted; pileus membranaceous, furrowed, furfuraceous, brown-orange; lamellæ pale, changing to black; stipes equal, fragile. *Fries*, Syst. Mycol. v. 1. p. 309. *Ag. ferrugineus*, *Pers.* Syn. Fung. p. 400. *Ag. congregatus*, *Sow.* Fung. t. 261. (*excellent*). *Hook.* Fl. Scot. 2. p. 23.

HAB. At the roots of trees, gate-posts, &c. extremely common. May to November.

Tufted. *Pileus* ovato-companulate, 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. *Lamellæ* 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.

77. Ag. *cinereus*, pileus furrowed, subtomentose, cinereous, smooth on the summit; lamellæ linear; stipes tall, attenuated upwards. *Pers.* Syn. Fung. p. 398. *Hook.* Fl. Scot. 2. p. 24. *Fries*, Syst. Mycol. v. 1. p. 310.

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. *Lamellæ* 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," (*Bolt.*) 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.

78. Ag. *niveus*, pileus campanulate, farinose with minute scales; stipes snow-white, tomentose; lamellæ narrow, at length brownish-black. *Pers.* Syn. Fung. p. 400. *Fries*, Syst. Mycol. v. 1. p. 311.

HAB. On dung, frequent. Autumn.

Pileus campanulate, straight, at length expanded and revolute, ½–1 inch broad, white while young, and covered with delicate white farinose scales,

membranaceous, turning reddish and at last black. *Lamellæ* 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.

79. Ag. *plicatilis*, very tender, pileus conical, at length plane, umbilicated, plicate; lamellæ not reaching to the stipes, distant, dark grey; stipes smooth, weak. *Sow.* Fung. t. 364. *Hook.* Fl. Scot. 2. p. 24. *Fries*, Syst. Mycol. v. 1. p. 312. *Ag. pulcher*, *Pers.* Syn. Fung. p. 404.

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. *Lamellæ* 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.

80. Ag. *ephemerus*, ovato-campanulate, scaly while young, afterwards glabrous, becoming expanded and revolute, grey or tinged with brown, very thin, splitting; lamellæ distant; stipes naked. *Pers.* Syn. Fung. p. 149. *Fries*, Syst. Mycol. v. 1. p. 313. *Ag. stercorarius*, *Sow.* Fung. t. 262. *Hook.* Fl. Scot. 2. p. 23.

HAB. On dunghils. 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, ½–1½ inches broad. *Lamellæ* 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.

81. Ag. *radiatus*, very delicate and fugacious, pileus grey, furfuraceous, at length splitting in a radiated manner, glabrous, brownish in the centre; stipes filiform. *Pers.* Syn. Fung. p. 407. *Fries*, Syst. Mycol. v. 1. p. 314.

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 lamellæ forming angles at the margin, producing the effect of the "spokes of a wheel," centre ochraceous, striate, splitting. *Lamellæ* 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.*)

82. Ag. *ulmarius*, pileus compact, smooth, pale whitish; lamellæ adnate or subdecurrent, whitish; stipes strong, ascending, incrassated at the base, excentrical. *Sow.* Fung. t. 67. *Pers.* Syn. p. 473. *Fries*, Syst. Mycol. v. 1. p. 186.

HAB. On the trunks of living trees, chiefly Elms. Autumn. Trees at Carlowrie; rare.

Pileus obtuse, 3–5 inches broad, smooth, subcoriaceous, but within very

white, soft, yet of close texture, thick, sometimes marbled with livid spots. *Lamellæ* 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.

83. Ag. *ostreatus*, tufted; stipes sublateral or none; pileus smooth, fleshy, pale blueish-grey or brown; lamellæ whitish, often anastomosing at the base. *Sow.* Fung. t. 421. *Pers.* Syn. Fung. p. 477. *Fries*, Syst. Mycol. v. 1. p. 182.

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. *Lamellæ* numerous, whitish, decurrent, broad, anastomosing at the base. *Stipes* when present, almost lateral, solid, very short, frequently wanting, especially in large plants.

84. Ag. *mollis*, gregarious; pileus soft, smooth, gibbous, pale yellow-brown; lamellæ pale reddish-brown, somewhat ventricose; stipes none. *Pers.* Syn. Fung. p. 480. *Sow.* Fung. t. 98.

HAB. On trunks of decaying trees, and rotten stumps of felled trees. Autumn. Foxhall, Captain Wauch. Abercorn Park, and elsewhere, in woods.

Gregarious. *Pileus* soft, becoming less so in age, 1–2 inches broad, plano-convex, pale yellowish or brownish, slightly fleshy, smooth. *Lamellæ* rather distant, or not numerous, pale reddish-brown, somewhat ventricose towards the base, much attenuated towards the margin. *Stipes* none.

85. Ag. *variabilis*, pileus membranaceous, white, cottony, at first subresupinate, at length reflexed; lamellæ whitish, afterwards pinkish-buff. *Pers.* Syn. Fung. p. 483. *Fries*, Syst. Mycol. v. 1. p. 275. *A. niveus*, *Sow.* Fung. t. 97.

HAB. On sticks in damp woods and hedges. Spring to autumn, very common.

Often gregarious. *Pileus* ¼–1 inch broad when reflexed, at first subresupinate, and involute, surface fine white, cottony. *Lamellæ* 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.*

1. C. *cibarius*, rich buff-yellow; pileus fleshy, irregular, smooth; veins tumid; stipes solid, attenuated at the base. *Fries*, Syst. Mycol. v. 1. p. 318. *Merulius cantharellus*, *Pers.* Syn. Fung. p. 488. *Hook.* Fl. Scot. 2. p. 25. *Agaricus cantharellus*, *Sow.* Fung. t. 46.

HAB. In woods, particularly of fir trees, borders of fields, &c. common, 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.

2. C. *lutescens*, pileus submembranaceous, funnel-shaped, waved, yellowish or olivaceous brown; veins anastomosing; stipes hollow, yellow. *Fries*, Syst. Mycol. v. 1. p. 320. *Merulius lutescens*, *Pers.* Syn. Fung. p. 489. *Agaricus cantharelloides*, *Sow.* Fung. t. 47.

HAB. Moist woods, rare. Balmuto. Summer and autumn.

Pileus 1–3 inches broad, depressed, at length infundibuliform, yellowish livid-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).*

3. C. *lobatus*, horizontal, sessile, lobed, membranaceous, dilute brown; veins branched. *Fries*, Syst. Mycol. v. 1. p. 323. *Helvella membranacea*, *Sow.* Fung. t. 348.

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 *retirugus*. The latter has frequently been associated with it.

141. MERULIUS. *Hall.*

1. M. *lacrymans*, effused, large, yellow-ferruginous, or deep orange, margin white, and cottony; veins large, forming irregular pores by their sinuosity. *Fries*, Syst. Mycol. v. 1. p. 328. *M. destruens*, *Pers.* Syn. Fung. p. 496. *Boletus lacrymans*, *Sow.* Fung. t. 113. and *Bol. arboreus*, t. 346.

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 plicæ, 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 1–8 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 sinuous; either irregular sinuosities of the same substance and texture as the pileus, or anastomosing lamellæ, sometimes forming elongated and very flexuose pores.*

142. DÆDALEA. *Pers.*

Obs.—*This genus approaches most near to* Polyporus; *but, when the hymenium is composed of sinuose lamellæ, so much anastomosing as to produce elongated pores, the latter are more variable in figure and more flexuose than in the genus* Polyporus.

* *Furnished with a stipes—(rarely sessile).*

1. D. *biennis*, pileus somewhat corky, depressed, rather velvety, subferruginous; hymenium composed of labyrinth-like pores, grey flesh colour; stipes irregular, central, or nearly lateral, rarely almost wanting. *Fries*, Syst. Mycol. v. 1. p. 332. *Boletus biennis*, *Sow.* Fung. t. 190. *Sistotrema bienne*, *Pers.* Fung. p. 550.

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.*

2. D. *quercina*, sessile, pale, with a woody aspect; pileus suberose, rugose, glabrous; hymenium contorted, sinuous, anastomosing. *Pers.* Syn. Fung. p. 500. *Hook.* Fl. Scot. 2. p. 26. *Fries*, Syst. Mycol. v. 1. p. 333. *Agaricus quercinus*, *Sow.* Fung. t. 181.

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. *Lamellæ* thick, irregular, flexuose, branching and anastomosing, often forming large shapeless pores.—Sowerby's plate is excellent.

Used as a styptic in stopping hæmorrhages.

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

central. *Fries*, Syst. Mycol. v. 1. p. 350. *Boletus perennis*, *Sow.* t. 192. *Pers.* Syn. Fung. p. 518.

HAB. On the ground in sandy places, about the roots of trees. Road sides in sandy woods; common. The whole year. Dundas Hill.

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* ½–1 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*.

2. P. *varius*, pileus rigid, glabrous, smooth; pores small, roundish, pale; stipes short, smooth, pale, becoming suddenly black at the base. *Fries*, Syst. Mycol. v. 1. p. 352. *Boletus varius*, *Pers.* Syn. Fung. p. 523. *B. badius*, *Pers.* Syn. p. 523. *B. variegatus?* *Sow.* Fung. t. 368. *B. lateralis*, *Hook.* Fl. Scot. 2. p. 27. *B. nummularius*, *Sow.* Fung. t. 89. *Pers.* Syn. p. 519.

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 sporules 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 imbricated, the whole mass is sometimes 4 or 5 inches broad.

3. P. *squamosus*, large, pileus fleshy, pale, dirty yellowish, with broad dark-coloured scales; pores large, angular, whitish, becoming mere reticulations at the base; stipes very short, sublateral. *Fries*, Syst. Mycol. v. 1. p. 343. *Boletus squamosus*, *Sow.* Fung. t. 266. *Hook.* Fl. Scot. 2. p. 27. *B. platyporus*, *Pers.* Syn. Fung. p. 521.

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 pentagonous, 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 *Bol. rangiferinus* of Withering.

** *Sessile, (sometimes with an excessively short stipes as in P. betulinus).*

† *Pileus sessile or dimidiate, not reflexed.*

4. P. *betulinus*, pileus subsessile, not dimidiate, compact, smooth, pale whitish-brown; pores white, small, unequal. *Fries*, Syst. Mycol. v. 1. p. 358. *Boletus betulinus*, *Sow.* Fung. t. 212. *Pers.* Syn. Fung. p. 535.

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.

5. P. *salicinus*, sessile or dimidiate, between suberose and coriaceous, roundish, smooth, white, at length brownish; pores white, becoming yellowish-brown, short, irregular. *Bol. salicinus*, *Sow.* Fung. t. 227. *Hook.* Fl. Scot. 2. p. 27. *B. suaveolens*, var. β. *Fries*, Syst. Mycol. v. 1. p. 366. *Pers.* Syn. Fung. p. 530.

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 Linnæus mentions, that the Laplanders carry it about them when they visit their mistresses, in order to render themselves more agreeable.

6. P. *hispidus*, pileus dimidiate, large, somewhat fleshy, thick, villose, ferruginous; pores yellowish, pale, and fringed at the orifices. *Fries*, Syst. Mycol. v. 1. p. 362. *Grev.* Crypt. Fl. t. 14. *Boletus hispidus*, *Pers.* Syn. Fung. p. 526. *Bol. spongiosus*, *Hook.* Fl. Scot. 2. p. 27. *Bol. velutinus*, *Sow.* Fung. t. 345.

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-

ish-grey, soft within, margin pale glaucous, as well as the pores (which are very minute), but at length ferruginous. *Fries*, Syst. Mycol. v. 1. p. 374. *Boletus fomentarius*, *Sow.* Fung. t. 133. *Pers.* Syn. p. 536. *Hook.* Fl. Scot. 2. p. 28.

HAB. On trunks of trees, especially old decaying Birches. On birch trees about Edinburgh, rare. Swanston wood. The whole year.

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.

8. P. *igniarius*, hard; pileus thick, obtuse, smoothish, mostly ferruginous, blackish at the base, banded, margin convex; pores minute, greenish, at length cinnamon colour. *Fries*, Syst. Mycol. v. 1. p. 375. *Boletus igniarius*, *Sow.* Fung. t. 132. *Pers.* Syn. Fung. p. 534. *Hook.* Fl. Scot. 2. p. 28.

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.*

9. P. *cæsius*, pileus fleshy, subsericeous, white, changing to blueish; pores minute, white, irregular, lacerating. *Fries*, Syst. Mycol. v. 1. p. 360. *Boletus cæsius*, *Pers.* Syn. Fung. p. 526. *Sow.* Fung. t. 226.

HAB. On the decaying or dead trunks of Fir trees, especially such as lie prostrate. Woods, Balmuto.

Pileus ½–3 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.

10. P. *velutinus*, imbricated, scarcely reflexed, whitish or brownish-grey; pileus between corky and coriaceous, thin, velvety, obscurely zoned; pores excessively short, minute, round, whitish. *Fries*, Syst. Mycol. v. 1. p. 368. *Boletus velutinus*, *Pers.* Syn. Fung. p. 539. and *Bol. lutescens*, p. 539.

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.

11. P. *versicolor*, pileus mostly reflexed, coriaceous, villose, variegated by zones of different colours; pores round, white, short. *Fries*, Syst. Mycol. v. 1. p. 368. *Boletus versicolor*, *Sow.* Fung. t. 229. *Pers.* Syn. Fung. p. 540. *Hook.* Fl. Scot. 2. p. 27.

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.

12. P. *abietinus*, effused, but at length mostly reflexed; pileus thin, coriaceous, villose, white; pores violet, at length brownish and toothed, lacerating. *Fries*, Syst. Mycol. v. 1. p. 370. *Boletus abietinus*, *Pers.* Syn. Fung. p. 541. *Sistotrema violaceum*, *Pers.* Syn. p. 551.

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.)*

13. P. *ferruginosus*, effused, thick, portions sometimes growing out horizontally, ferruginous; pores roundish, very unequal; flesh none. *Fries*, Syst. Mycol. v. 1. p. 378. *Boletus ferruginosus*, *Pers.* Syn. Fung. p. 544.

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.

14. P. *medulla-panis*, effused, somewhat waved, hard, dry, white; pores unequal, not minute. *Fries*, Syst. Mycol. v. 1. p. 380. *Bol. medulla-panis*, *Pers.* Syn. Fung. p. 544.

HAB. On decaying, prostrate trunks and branches of trees. Spring to autumn. Dundas Hill.

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.

15. P. *vulgaris*, broadly effused, thin, dry, smooth, white; pores minute, subequal. *Fries*, Syst. Mycol. v. 1. p. 381. *Bol. proteus*, *Bolt.* Fung. t. 166.

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.

16. P. *incarnatus*, effused, coriaceous, very thin, submarginate; pores orange-flesh colour, minute, round, suboblique. *Fries*, Syst. Mycol. v. 1. p. 379. *Boletus incarnatus*, *Pers.* Syn. Fung. p. 546.

Hab. On trunks of Fir trees, especially when in a state of decay. Summer and autumn. Drumshoreland 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.*

1. B. *luteus*, pileus glutinous, varying from bright yellow to fulvous; tubes adnate, yellow; stipes firm, with an annular veil. *Sow.* Fung. t. 265. *Hook.* Fl. Scot. 2. p. 27. *Fries*, Syst. Mycol. v. 1. p. 386. *B. cortinatus*, *Pers.* Syn. Fung. p. 303.

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.

2. B. *bovinus*, pileus slightly glutinous, reddish-brown, thin; tubes adnate, compound, yellowish; stipes smooth. *Fries*, Syst. Mycol. v. 1. p. 388. *Bol. gregarius*, *Fl. Dan.* t. 1018. *(not characteristic except the one shewing the tubes). With.* Bot. Arr. ed. 6. v. iv. p. 382.

Hab. Fir woods. Very common in subalpine countries. Plantations at the foot of the Pentland Hills. Summer and autumn.

Gregarious. *Pileus* nearly plane, somewhat glutinous, thin, 2–3 inches broad, pinkish or reddish-brown. *Flesh* white, not changing colour.

Tubes 2–3 lines 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.

3. B. *piperatus*, pileus reddish or brownish-yellow, smooth; tubes adnate, somewhat decurrent, large, ferruginous; stipes smooth, deep yellow. *Sow.* Fung. t. 34. *Pers.* Syn. Fung. p. 507. *Fries*, Syst. Mycol. v. 1. p. 388.

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.

4. B. *subtomentosus*, pileus rounded, dry, subtomentose, reddish or olivaceous; tubes adnate, large, angular, yellow; stipes very firm, smooth. *Pers.* Syn. Fung. p. 506. *Fries*, Syst. Mycol. v. 1. p. 389.

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 areolæ, 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*).

5. B. *luridus*, pileus convex, subtomentose, mostly olivaceous; tubes nearly free, round, yellow, the orifices crimson-red; stipes thick, reticulated with crimson-red. *Pers.* Syn. Fung. p. 512. *Fries*, Syst. Mycol. v. 1. p. 391. *B. rubeolarius*, *Sow.* Fung. t. 150. *Pers.* Syn. p. 512.

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, ½–¾ 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.

6. B. *edulis*, pileus convex, smooth, cinereous, yellow or brown; tubes nearly free, roundish, minute, whitish, at length yellowish; stipes thick, reticulated; flesh white, not changing colour. *Pers.* Syn. Fung. p. 510. *Sow.* Fung. t. 111.

Hab. In woods, frequent. Near Rosslyn, and probably in many other places about Edinburgh. Autumn.

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.

7. B. *scaber*, pileus convex, glabrous; tubes free, round, whitish; stipes firm, attenuated upwards, scabrous. *Sow.* Fung. t. 175. *Pers.* Syn. Fung. p. 505. *B. aurantiacus*, *Sow.* Fung. t. 110. *Hook.* Fl. Scot. 2. p. 26.

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 lamellæ.*

145. SISTOTREMA. *Pers.*

1. S. *confluens*.

Pers. Syn. Fung. p. 551. *Fries*, Syst. Mycol. v. 1. p. 426. *Hydnum sublamellosum*, *Sow.* Fung. t. 112.

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.*

1. H. *repandum*, pileus fleshy, smooth, subrepand, buffish; subulate processes of the hymenium, unequal, pale; stipes unequal, thick. *Sow.* Fung. t. 176. *Pers.* Syn. Fung. p. 555. *Hook.* Fl. Scot. 2. p. 28. *Fries*, Syst. Mycol. v. 1. p. 400.

HAB. Woods, frequent. Balmuto. Newliston woods and Foxhall, Captain Wauch. Autumn.

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, 1½–2 inches long, expanding into the pileus. *Colour* of

the whole plant, pale buff, pinkish, or somewhat reddish.—Solitary or gregarious.

2. H. *auriscalpium*, pileus coriaceous, tomentose; stipes lateral, tomentose. *Sow.* Fung. t. 267. *Hook.* Fl. Scot. 2. p. 28. *Fries*, Syst. Mycol. v. 1. p. 406.

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 tomentose stipes (near 2 inches high) of a similar colour, that farther description is unnecessary. The diameter of the pileus is about ¾ 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, subentire, compressed, villose at the apex. *Fries*, Syst. Mycol. v. 1. p. 423. *Sistotrema spathulatum, Pers.* Syn. Fung. p. 553.

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 resupinate plants. Hymenium warty, minutely hairy, papillose or smooth.* (THELEPHORIDEÆ.)

147. THELEPHORA, *Pers.*

* *Pileus striato-fibrous; either furnished with a sort of stipes or sessile. Growing on the ground.*

1. Th. *caryophyllæa*, somewhat tufted, stipitate or sessile; pileus irregular, rarely quite entire, striato-fibrous, purplish-brown, margin often laciniate. *Pers.* Syn. Fung. p. 565. *Fries*, Syst. v. 1. p. 43. *Pers.* Mycol. v. 1. p. 112. *Hook.* Fl. Scot. 2. p. 29. *Auricularia caryophyllea, Sow.* Fung. t. 213. *Th. laciniata, Pers.* Syn. p. 567. *Fries*, Syst. p. 431.

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 ½ of an inch high, at others, sessile and imbricated with an irregular, 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 *Thelephoræ*, preserves its character in drying.

2. Th. *terrestris*, irregularly tufted, dark fuscous; pileus

rather thick, striato-fibrous, sessile, often imbricated, sometimes with a very short lateral stipes. *Pers.* Syn. Fung. p. 506. et Mycol. v. 1. p. 113. *Fries*, Syst. v. 1. p. 431.

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.*

3. Th. *intybacea*, imbricated, velvety, zoned, pale reddish-buff; hymenium smooth, irregularly papillose, buffish, at length ferruginous, sometimes shooting out into rude stems, anastomosing, and producing irregular pilei. *Pers.* Syn. Fung. p. 567. et Mycol. v. 1. p. 110. *Fries*, Syst. v. 1. p. 431.

HAB. On stumps of trees, generally in contact with the ground. Autumn and spring. Auchindenny 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.

4. Th. *hirsuta*, effuso-reflexed, coriaceous, strigose; hymenium smooth, yellowish or orange-buff. *Pers.* Syn. Fung. p. 570. et Mycol. v. 1. p. 116. *Fries*, Syst. v. 1. p. 439. *Hook.* Fl. Scot. 2. p. 29. *Auricularia reflexa*, *Sow.* Fung. t. 27.

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.

5. Th. *purpurea*, imbricated, subcoriaceous, zoned, hirsute; hymenium smooth, purple. *Pers.* Syn. Fung. p. 571. et Mycol. v. 1. p. 121. *Fries*, Syst. v. 1. p. 440. *Hook.* Fl. Scot. 2. p. 29. *Auricularia persistens*, *Sow.* Fung. t. 388. f. 1.

HAB. On stumps of trees, gate-posts, &c. Perennial. Frequent. Foxhall, Captain Wauch. In most woods about Edinburgh.

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.

6. Th. *rubiginosa*, imbricated, rigid, somewhat zoned, purplish, reddish-brown, glabrous; hymenium papillose, minutely velvety, rubiginose, paler at the margin. *Pers.* Syn. Fung. p. 567. et Mycol. v. 1. p. 120. *Fries*, Syst. v. 1. p. 436. *Hook.* Fl. Scot. 2. p. 29. *Auricularia ferruginea*, *Sow.* Fung. t. 26.

HAB. On the stumps and fallen trunks of trees, frequent. Perennial. Auchindenny woods. January.

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.*

7. Th. *corylea*, broadly effused, thickish, the margin slightly reflexed; hymenium ochraceous, uneven, unequally papillose. *Pers.* Mycol. v. 1. p. 126. *Th. rugosa*, var. *β*. *Pers.* Syn. p. 569. *Fries*, Syst. Mycol. v. 1. p. 439.

HAB. On decaying and dead hazel-trees. The whole year; common. Auchindenny woods. January.

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 papillæ.—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 papillæ. *Fries*, Syst. v. 1. p. 446. *Pers.* Mycol. v. 1. p. 137.

HAB. On rotten trunks and branches of trees, frequent. Woods about Edinburgh. Autumn.

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, papillæ 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.

HAB. On damp hewn fir-timber in the dock-yard at Leith. Autumn.

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.

10. Th. *sanguinolenta*, circular, effused, margin sometimes free, rarely reflexed; hymenium pale whitish-brown, pruinose, silky and minutely byssoid at the margin, turning red when wounded. *Fries*, Syst. v. 1. p. 440. *Th. sericea*, var. β. *Pers.* Mycol. v. 1. p. 117.

HAB. On decaying and dead trunks of fir-trees, frequent. Braid Hermitage, in November.

From 1–2 inches broad, very gregarious, confluent, thin, closely following the inequalities of the bark, minutely byssoid, 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.

11. Th. *corium*, coriaceous, broad, thin, margin free, with the surface tomentose; hymenium smooth, minutely reticulated, buff, becoming darker in age. *Pers.* Syn. Fung. p. 574. *Th. incarnata*, var. β.? *Pers.* Mycol. v. 1. p. 131.

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, hirsute, 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.

12. Th. *sinuans*, roundish, thick, often confluent, margin waved, splitting; hymenium tuberculose, yellowish or reddish-brown, cracking. *Pers.* Mycol. v. 1. p. 128.

HAB. Branches, chiefly of oak-trees. Autumn and winter. Auchindenny 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; tubercles sometimes very large and rounded.

**** *Wholly resupinate, effused, substance various.*

† *Hymenium dull flesh-colour, cinereous or purplish brown.*

13. Th. *quercina*, resupinate, rigid, nearly black beneath; hymenium flesh-colour, rugose and papillose, at length cracking. *Pers.* Syn. Fung. p. 573. et Mycol. v. 1. p. 124.

HAB. On the fallen branches of oak trees. Very common. Spring and autumn.

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.

14. Th. *fraxinea*, very thin, effused, cracking and becoming involute, very dark beneath; hymenium brownish-grey, minutely farinose, papillose. *Pers.* Mycol. v. 1. p. 145. *Th. cinerea*, var. *β. Pers.* Syn. p. 580.

HAB. On dead and decaying ash-branches. Very common. Autumn.

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.

15. Th. *Tiliæ*, effused, extremely thin, margin adpressed, minutely villose; hymenium purplish-grey, covered with small unequal papillæ. *Pers.* Mycol. p. 147.

HAB. On dead branches, chiefly of the lime-tree. Woods about Edinburgh. Autumn 1822.

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.*

16. Th. *epidermea*, effused, thin, smooth, margin delicate and byssoid; hymenium whitish at first, at length very pale buff; papillæ scattered, or none. *Pers.* Mycol. v. 1. p. 136.

HAB. On dead and decayed trunks and branches of trees. Braid Hermitage. November.

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 *sphæriæ*; in my specimen of *Thel. epidermea*, they are formed by an incrusted *stilbospora*.

17. Th. *incrustans*, effused, spreading over moss, &c. margin fibrous; hymenium very unequal, tuberculose, yellowish. *Pers.* Syn. Fung. p. 577. *Frics*, Syst. Mycol. v. 1. p. 448. *Th. sebacea*, *Pers.* Syn. p. 577. et Mycol. v. 1. p. 135.

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.*

18. Th. *calcea*, effused, unequal in thickness, hard; hymenium white, glabrous, cracked in different directions, so as to be often tessellated, obtusely papillose. *Pers.* Syn. Fung. p. 581. et Mycol. v. 1. p. 153., exclud. var. γ.

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.

19. Th. *Sambuci*, effused, membranaceous, thin, margin entire; hymenium very white, glabrous, subpapillose. *Pers.* Mycol. v. 1. p. 152. *Th. calcea*, var. γ. *Pers.* Syn. p. 581. *Th. cretacea*, *Fries*, Obs. Mycol. v. 1. p. 153.

HAB. On decaying elder-trees, not unfrequent. Slateford. Autumn.

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.*

1. M. *cristatum*, subdecumbent, pale greyish or yellowish, branches effused, plane, expanding, fimbriato-laciniate. *Pers.* Syn. Fung. p. 583. et Mycol. sect. 1. p.. 156. *Clavaria laciniata*, *Sow.* Fung. t. 158. *Thelephora cristata*, *Fries*, Syst. v. 1. p. 434.

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.*

2. M. *fœtidum*, erect, purple-brown, branches compressed, palmate, folded, paler at the summits. *Grev.* Crypt. Fl. t. 46. *Pers.* Syn. Fung. p. 584. *M. palmatum*, *Pers.* Mycol. v. 1. p. 157. *Cl. anthrocephala*, *Sow.* Fung. t. 156. *Thelephora palmata*, *Fries*, Syst. v. 1. p. 432.

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. Cl. *pratensis*, yellow, tufted; stipes short, producing numerous short geniculate, divaricate branches, the ramuli subfastigiate, obtuse. *Pers.* Syn. Fung. p. 590. et Mycol. v. 1. p. 169. *Fries*, Syst. v. 1. p. 471. *With.* Bot. Arr. ed. 6. v. 4. p. 438. *Cl. fastigiata*, *Hook.* Fl. Scot. 2. p. 29.

HAB. In meadows and mossy pastures. Autumn. Very frequent.

1–2 inches high, but seldom more than one, moist, subviscous, 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.

2. Cl. *corniculata*, yellow, erect, much branched in a dichotomous manner; branches slender, with acute summits. *Pers.* Syn. Fung. t. 589. et Mycol. v. 1. p. 171. *Fries*, Syst. v. 1. p. 471. *Cl. muscoides*, *Sow.* Fung. t. 157. *Hook.* Fl. Scot. 2. p. 30.

HAB. Meadows, grassy woods, &c. Autumn, frequent. Dalmahoy, Countess of Morton. Carlowrie.

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.

3. Cl. *abietina*, dull ochrey-yellow, much branched, white and tomentose at the base, turning green when bruised; branches erect, crowded, slightly rugose, with acute, often forked summits. *Pers.* Syn. Fung. p. 589. et Mycol. v. 1. p. 164. *Fries*, Syst. v. 1. p. 469.

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.

4. Cl. *coralloides*, white, erect, stipes thick; branches elongated, irregular, unequal, mostly acute. *Sow.* Fung. t. 278. *upper fig.* *Hook.* Fl. Scot. 2. p. 29. *Fries*, Syst. v. 1. p. 467. *Cl. alba*, *Pers.* Mycol. v. 1. p. 161.

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.

5. Cl. *cristata*, white or cinereous, tufted, branched, smooth; branches dilated at the summit and jagged, or shortly, but acutely laciniate. *Pers.* Syn. p. 591. et Mycol. v. 1. p. 166. *Fries*, Syst. v. 1. p. 473.

HAB. Woods, in autumn. Balmuto.

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 sphæria.

6. Cl. *cinerea*, grey, often with a blueish or purplish tinge, much branched, unequally incrassated, rugose, often subcompressed; summits either very obtuse or somewhat acuminate. *Grev.* Crypt. Fl. t. 63. *Pers.* Syn. Fung. p. 586. *Fries.* Syst. v. 1. p. 468. *Cl. fuliginea*, *Pers.* Mycol. v. 1. p. 166. *Cl. grisea*, *Pers.* Syn. p. 586. *Fries*, Syst. v. 1. p. 468.

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.

7. Cl. *cornea*, yellow, gregarious, half an inch high, branched or nearly simple, viscose, stipes of several plants connected at the base. *Pers.* Syn. Fung. p. 596. *Sow.* Fung. t. 40. *Hook.* Fl. Scot. 2. p. 30.

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 ⅓ to ½ an inch high, orange-yellow, simply branched, branches somewhat aculeate, when very young soft, when old, dry and quite corneous.

** *Simple, rugose, often obtusely divided at the summit into a few processes resembling branches.*

8. Cl. *rugosa*, white, gregarious, incrassated, rugose, simple or branched, branches few, short, obtuse. *Pers.* Syn. p. 594. et Mycol. v. 1. p. 173. *Fries*, Syst. v. 1. p. 474. *Cl. coralloides*, *Sow.* Fung. t. 278. lower fig.

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 clavariæ.

**** Simple.*

9. Cl. *inæqualis*, yellow, or yellow-white, tufted or gregarious, fragile, unequal, ventricose, deformed, somewhat acuminate, often bifurcate and irregular at the apex. *Pers.* Mycol. v. 1. p. 178. *Fries*, Syst. v. 1. p. 481. *Cl. vermiculata*, *Sow.* Fung. t. 253.

HAB. Meadows and pastures, and grassy woods. Autumn. Very frequent.

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.

10. Cl. *helvola*, yellow, gregarious, cylindrical, equal, smooth, obtuse, slender below and paler, apex frequently of a cinnamon colour. *Pers.* Syn. Fung. p. 598. et Mycol. v. 1. p. 180. *Fries*, Syst. v. 1. p. 482.

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.

11. Cl. *vermicularis*, pure white, tufted, crowded, subulate, flexuose, solid, but with a small perforation, mostly somewhat connected at the base. *Fries*, Syst. v. 1. p. 484. *Cl. vermiculata*, var. *β*. *Pers.* Mycol. v. 1. p. 184.

HAB. Meadows and pastures. Autumn, frequent. Balmuto. Abercorn Park.

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.

12. Cl. *fragilis*, yellow or white, gregarious, sometimes subcæspitose, solid or hollow, very brittle, rather firm, attenuated at the base, subrugose in age, and often crooked. *Grev.* Crypt. Fl. t. 37. *Fries*, Syst. v. 1. p. 484. *Cl. eburnea*, *Pers.* Syn. Fung. p. 603. et Mycol. v. 1. p. 183. *Cl. gracilis*. *Sow.* Fung. t. 232.

HAB. On the naked soil in damp woods. Autumn. Foxhall, Captain Wauch. Slateford; Balmuto, &c. Frequent.

Plant ½–2 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 cæspitose, 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. virgultorum* 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. *setipes*, white, minute; hymenium oblong or ovato-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.*

1. Ph. *filiformis*, white, filiform, elongated, somewhat villose at the base; radicular tuber, dark fuscous, lenticular. *Clavaria phacorhiza*, *Sow.* Fung. t. 253. *Pers.* Syn. Fung. p. 607. and Mycol. vol. 1. p. 192. *Typhula phacorhiza*, *Fries*, Syst. v. 1. p. 495.

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 *.

2. Ph. *erythropus*, gregarious, minute; hymenium smooth, white, short, terminating in an elongated, filiform, dark pink-red stipes. *Grev.* Crypt. Fl. t. 43. *Clavaria erythropus*, *Pers.* Syn. Fung. p. 606., and Mycol. vol. 1. p. 191. *Typhula erythropus*, *Fries.* Syst. v. 1. p. 495.

HAB. On sticks, leaves, or often springing from within decaying culms of grasses, and thus concealing the tuber. Autumn. Balmuto.

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* I have extended Persoon's genus *Phacorhiza*, and made it include all those clavariform 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.*

1. G. *hirsutum*, stipes hirsute, deep black; hymenium somewhat plicate. *Pers.* Syn. Fung. p. 608., and Mycol. vol. 1. p. 194. *Hook.* Fl. Scot. 2. p. 30. *Fries.* Syst. v. 1. p. 488. *Clavaria ophioglossoides*, *Sow.* Fung. t. 83.

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.

2. G. *viscosum*, smooth, very slimy in moist weather, black; hymenium cylindrical, rounded at the apex, confluent with the stipes, which is thin and attenuated downwards. *Grev.* Crypt. Fl. t. 55. *Pers.* Syn. Fung. p. 609., and Mycol. vol. 1. p. 197. *Fries*, Syst. v. 1. p. 489.

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.*

1. L. *uliginosa*, yellow, subgregarious; pileus orange-yellow, obtuse, hollow, margin connate with the stipes. *Pers.* Mycol. p. 200. *L. Ludwigii*, *Dicksoni*, *Bulliardi*, and *laricina*, *Pers.* Syn. Fung. p. 611.—614. *Leotia epiphylla*, *Hook.* Fl. Scot. 2. p. 30. *Clavaria epiphylla*, *Sow.* Fung. t. 293. *Mitrula paludosa*, *Fries*, Syst. v. 1. p. 491.

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.

2. L. *Mitrula*, gregarious, solid; hymenium ovate, yellow-cinnamon; stipes slender, dark brown, flexuose at the base. *Grev.* Crypt. Fl. t. 81. *Pers.* Syn. Fung. p. 611., and Mycol. vol. 1. p. 199. *M. Heyderia Abietis*, *Fries*, Syst. v. 1. p. 492.

Clavaria ferruginea, *Sow.* Fung. t. 84. *M. Heyderia pusilla*, *Fries*, Syst. v. 1. p. 493.

HAB. In fir woods, and under fir trees. Autumn. Balmuto.

Gregarious, ½–1 inch long, dry, growing among dead fir leaves. *Stipes* flexuose, dark, firm, slender, smooth, but somewhat tomentose at the base.

3. L. *lubrica*, tremellose; pileus tumid, spreading, olivaceous, the margin rounded; stipes orange, cylindrical or unequally compressed. *Grev.* Crypt. Fl. t. 56. *Pers.* Syn. Fung. p. 613. et Mycol. p. 201. t. 9. f. 4–7. *Fries*, Syst. v. 2. p. 29. *Helvella gelatinosa*, *Sow.* Fung. t. 70.

HAB. Moist woods on the ground in autumn. Foxhall, Captain Wauch. Balmuto.

Gregarious, almost tufted, 1–3 inches high. *Pileus* ½–¾ 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.*

1. H. *Mitra*, pileus dark livid, inflated, deflexed and partially adnate with the stipes; stipes deeply furrowed and lacunose, white. *Grev.* Crypt. Fl. t. 36. *Pers.* Syn. Fung. p. 615. et Mycol. v. 1. p. 210. *Hook.* Fl. Scot. 2. p. 31. except syn. *Sow.*

HAB. Woods, hedge-banks, meadows. Autumn. Foxhall, Captain Wauch. Millburn; Abercorn Park, Duddingston; Balmuto.

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.

2. H. *leucophæa*, pileus irregularly deflexed, free, often variously lobed, yellowish-white; stipes deeply sulcate and lacunose, white. *Pers.* Syn. Fung. p. 616., and Mycol. v. 1. p. 210. *Helv. Mitra*, *Sow.* Fung. t. 39.

HAB. Woods, borders of fields, &c. Autumn. Foxhall, Captain Wauch. Abercorn Park.

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.

154. MORCHELLA. *Dillw.*

1. M. *esculenta*, pileus roundish or oval, margin contracted round the stipes; areolæ much hollowed; stipes white, dilated towards the base. *Grev.* Crypt. Fl. t. 68. *Pers.* Syn. Fung. p. 618., and Mycol. v. 1. p. 206. *Hook.* Fl. Scot. 2. p. 31. *Helvella esculenta*, *Sow.* Fung. t. 51. left-hand fig.

HAB. Woods; borders of fields. Spring. Near Edinburgh, Miss Elliot. Banks of the South Esk, Dr Graham and Mr Macnab. Foxhall, Captain Wauch.

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.

2. M. *hybrida*, pileus short, conical, spreading at the base; areolæ shallow, partly formed by longitudinal parallel ribs; stipes long, equal, thick, white. *Grev.* Crypt. Fl. t. 89. *Pers.* Syn. Fung. p. 620. *M. crassipes*, *Pers.* Mycol. v. 1. p. 206. *Helvella hybrida*, *Sow.* Fung. t. 238.

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.*

1. Ph. *fœtidus*, volva large; stipes very cellulose, white; cells of the pileus containing a fetid, dull green, sporuliferous slime. *Sow.* Fung. t. 329. *Hook.* Fl. Scot. 2. p. 18. *Ph. impudicus*, *Pers.* Syn. Fung. p. 242.

HAB. Woods, hedges, &c. common. Summer and autumn. Foxhall, Captain Wauch. Balmuto, &c. frequent.

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 subfarinaceous.*

† *Sessile; sometimes split and convolute.*

1. P. *aurantia*, gregarious, flexuose, very brittle, white externally; hymenium fine orange. *Pers.* Syn. Fung. p. 637. *Hook.* Fl. Scot. 2. p. 33. *P. aurantiaca*, *Pers.* Mycol. v. 1. p. 222. *P. coccinea*, *Sow.* Fung. t. 78.

HAB. On the ground in sandy heathy places. Colinton. Road-sides about the Pentland Hills. Autumn.

A very splendid species, ½–1½ in diameter, remarkably brittle, often much crowded; sometimes split, but rarely with the split edges rolled in.

2. P. *umbrina*, gregarious, cæspitose, variously contorted, externally yellowish-brown; hymenium dull reddish-brown. *Pers.* Syn. Fung. p. 638., and Mycol. v. 1. p. 220. P. *cochleata*, *Sow.* Fung. t. 5.

HAB. In fields, waste places, &c. Summer and autumn. Foxhall, Captain Wauch. Near Edinburgh, Maughan. Abercorn Park, and elsewhere.

Very large and brittle, 1–3 inches high, 2–3 in diameter, cracking and convolute. It is not rare in Scotland.

3. P. *vesiculosa*, gregarious, cæspitose, globose at first, with the mouth connivent, at length campanulate, splitting, externally whitish, and tomentose at the base. *Sow.* Fung. t. 4. *Pers.* Syn. Fung. p. 641., and Mycol. v. 1. p. 228. *Hook.* Fl. Scot. 2. p. 33.

HAB. On dunghills, roofs of cottages, &c. Autumn.

Often much crowded, or densely cæspitose, 1–3 inches high, and as much in diameter. *Mouth* 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.

4. P. *repanda*, sessile, solitary, or somewhat tufted, large, at first hemispherical and concave, at length nearly plain, subrugose and brown within, the outer surface farinose, whitish; margin crenate. *Grev.* Crypt. Fl. t. 59. *Fries.* Syst. v. 2. p. 51. P. *granulosa*, *Pers.* Mycol. v. 1. p. 225.

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.*

5. P. *Macropus*, subgregarious, large, the pileus hemispherical, slightly hairy and verrucose, ash-coloured, the hymenium mouse-coloured, at length pale; stipes very long, incrassated below. *Grev.* Crypt. Fl. t. 70. *Pers.* Syn. Fung. p. 645., and Mycol. v. 1. p. 236. *Fries*, Syst. v. 2. p. 57. P. *stipitata*, *Sow.* Fung. t. 38.?

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* ½–1 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.*

6. P. *scutellata*, sessile, gregarious or scattered, nearly plane, external surface of the margin hispid with black rigid hairs; hymenium orange-red. *Sow.* Fung. t. 24. *Pers.* Syn. Fung. p. 650., and Mycol. v. 1. p. 256. *Hook.* Fl. Scot. 2. p. 33.

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.

HAB. On the bare soil in moist woods. Foxhall, Messrs Wauch and Greville. Autumn.

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 thecæ* containing 8 sporules.

8. P. *sulphurea*, sessile, small, gregarious, globose, at length plane, the strigose external surface yellow; hymenium white. *Grev.* Crypt. Fl. t. 83. *Pers.* Syn. Fung. p. 649., and Mycol. v. 1. p. 250. P. *Hydnoidea*, *Sow.* Fung. t. 178.?

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.

HAB. On the decayed stems of *Urtica dioica*. Summer and autumn. Captain Wauch.

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 ciliæ, it might have been called pectinate.

10. P. *nidulus*, sessile, gregarious, very minute, orbicular, somewhat depressed, substrigose, brown or nearly black. *Kunze*,

Fung. Germ. Exsic. fasc. 3. No. 72. *Moug. et Nestl.* St. Crypt. Exsicc. No. 588. *Pers.* Mycol. v. 1. p. 250.

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 multiflora*. It grows, however, on several *Umbelliferæ* in this country.

†† *Externally pubescent or tomentose.*

11. P. *coccinea*, stipitate, large, subinfundibuliform, externally white and tomentose; hymenium crimson-red. *Pers.* Syn. Fung. p. 652., and Mycol. v. 1. p. 258. P. *epidendra*, *Sow.* Fung. t. 13.

HAB. On dead branches of trees in woods, in spring. Rosslyn woods; rare.

Solitary or subgregarious, ½–1 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.

12. P. *pulchella*, subsessile, small, gregarious, externally very white and villose, mouth contracted; hymenium varying from dilute yellow to orange. *Pers.* Syn. Fung. p. 653. et Mycol. v. 1. p. 260. *Hook.* Fl. Scot. 2. p. 33. P. *bicolor*, *Sow.* Fung. t. 17. P. *calycina*, *Pers.* Syn. p. 653. (a stemmed variety). P *quercina*, *Pers.* Mycol. v. 1. p. 260.

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.

13. P. *virginea*, stipitate, gregarious, small; stipes rather long, pileus hemispherical, subpatulous, villose; whole plant white. *Pers.* Syn. Fung. p. 653. et Mycol. v. 1. p. 262. *Hook.* Fl. Scot. 2. p. 33. P. *nivea*, *Sow.* Fung. t. 65.

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.

14. P. *granuliformis*, sessile, very minute, gregarious, white, subglobose, villose, mouth more or less connivent. *Pers.* Syn. Fung. p. 651. et Mycol. v. 1. p. 267. *Pez. sessilis*, *Sow.* Fung. t. 389. f. 1. *P. villosa*, *Pers.* Syn. p. 655.

HAB. On decayed stems of herbaceous plants. Autumn. On potato stalks about Edinburgh, common.

Very minute, and only open in very moist weather; frequently much

crowded, ¼–½ a line in diameter. The most common appearance is that of a very minute villose globe.

15. P. *plumbea*, sessile, minute, gregarious, depressed, externally fusco-olivaceous, villose; hymenium smooth, blueish-grey. *Grev.* Crypt. Fl. t. 11.

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.

16. P. *cerina*, minute, sessile or subsessile, hemispherical, externally tomentoso-pulverulent, yellowish-olive; hymenium dull ochraceous. *Pers.* Syn. Fung. p. 651. et Mycol. v. p. 263. *Moug. et Nestl.* Stirp. Crypt. Exs. No. 687.

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.*

17. P. *inflexa*, stipitate, glabrous, white or yellowish, subinfundibuliform, margin fringed with inflexed teeth; stipes curved, elongated. *Sow.* Fung. t. 306. *P. coronilla*, *Pers.* Mycol. v. 1. p. 287.

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.*

18. P. *ochroleuca*, rather large, ochrey-brown, infundibuliform, at length concavo-repand, or very plane; stipes elongated, dark at the base. *Sow.* Fung. t. 115. *P. firma*, *Pers.* Syn. Fung. p. 658. et Mycol. v. 1. p. 277.

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, ½–¾ 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.

19. P. *fructigena*, gregarious, yellowish or reddish-white, subinfundibuliform, surface of the hymenium plane; stipes long, subflexuose, and attenuated. *Pers.* Syn. Fung. p. 660.

et Mycol. v. 1. p. 283. *Sow.* Fung. t. 117. *Nees*, Syst. t. 38. p. 292.

HAB. On nuts, acorns, beech-mast, &c. in woods. Foxhall, Captain Wauch. Balmuto. Very frequent.

Pileus 1–3 lines broad; *hymenium* plane, but the form of the pileus is obconical 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.

20. P. *infundibulum*, gregarious, globoso-infundibuliform, slightly concave; stipes rather short, attenuated; whole plant ferruginous or orange-brown. *Pers.* Mycol. v. 1. p. 279. *P. calyculus*, *Sow.* Fung. t. 116. *Pers.* Syn. p. 660.

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.

21. P. *campanula*, gregarious, white, rather small, very membranaceous, campanulate, unequal; stipes filiform, short. *Nees*, Syst. t. 38. f. 295. *Pers.* Mycol. v. 1. p. 284.

HAB. On small twigs and stems of dead herbaceous plants in moist woods. Autumn. Foxhall, Captain Wauch. Newliston woods.

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.

22. P. *sarcoides*, polymorphous, cæspitose, subgelatinous, somewhat firm, purplish-red, externally subvenose; hymenium concave. *Pers.* Syn. Fung. p. 633. et Mycol. 1. p. 320. *P. turbinata*, *Pers.* Syn. p. 634.

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* subgelatinose, tremellose, yet somewhat firm.

The following varieties are enumerated by Schumacher, and given in Persoon's Mycologia.

β. *obconica*, small, substipitate, pileus obconical, margin acute, waved, crenate, externally subvenose; hymenium somewhat concave.

γ. *lobata*, 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*, cæspitose, small, subcylindrical, glabrous, margin raised; hymenium somewhat concave.

ζ. *labyrinthiformis*, lamellose, 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, ½–1 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. 640. *P. porosa*, "*disco demum foraminulosa.*"

24. P. *citrina*, yellow, crowded, apparently sessile, but having a short thick obconical stipes, carnose; hymenium planoconcave. *Pers.* Syn. Fung. t. 663. et Mycol. v. 1. p. 293. *P. aurea*, *Sow.* Fung. t. 150.

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.

25. P. *aurea*, fulvous-orange, gregarious, crowded, minute, nearly plane, subtremella-like. *Pers.* Obs. Mycol. part 1. p. 41. et Syn. p. 635. et Mycol. sect. 1. p. 304. *P. chrysocoma*, *Sow.* Fung. t. 152.? *Bull.* t. 376. f. 2.?

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. *claroflava*, yellow, gregarious, minute, obconical, at length somewhat plane, margin raised, obtuse, externally somewhat paler.

Hab. On decayed wood and branches of trees. Autumn. Braid Hermitage.

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-

vex, but sometimes depressed in the centre, turning reddish in age and decay. *Pers.* Syn. Fung. p. 664. et Mycol. v. 1. p. 295.

HAB. On the decayed stems of the larger herbaceous plants, especially *Urtica dioica*. Autumn.

Scarcely 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.

29. P. *conigena*, white, gregarious, excessively minute, orbicular, subimmarginate. *Pers.* Syn. Fung. p. 634. et Mycol. v. 1. p. 303.

HAB. On the cones of various firs. On cones of the Scotch fir, Foxhall, Captain Wauch. Autumn.

Resembling white dots; subsessile. Persoon says it grows also on the bark of fir-trees.

30. P. *cinerea*, grey, gregarious, depressed, waved, subtremellose, margin obsolete. *Pers.* Syn. Fung. p. 634. et Mycol. v. 1. p. 302. *Sow.* Fung. t. 64.

HAB. On stumps of trees, rotten wood, fallen branches, &c. Very common about Edinburgh, in autumn.

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.

HAB. On fallen trunks and branches of trees. Autumn. Braid Hermitage.

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.

32. P. *atrovirens*, green, gregarious, minute, subtremellose, hemispherical, at length plane; becoming black in decay. *Pers.* Syn. Fung. p. 635. et Mycol. v. 1. p. 306.

HAB. On rotten wood. Autumn. Foxhall, Captain Wauch. Swanston wood, on a rotten fir-tree.

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.*

33. P. *prunastri*, substipitate, opake, rigid, black, marginate; hymenium concave. *Pers.* Syn. Fung. p. 673. et Mycol. v. 1. p. 330.

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 *sphæriæ*, which are not yet satisfactorily understood.

34. P. *Cerasi*, coriaceous, reddish-black, at first closed, at length expanded and plane. *Pers.* Syn. Fung. p. 673. et Mycol. v. 1. p. 329. *Moug.* et *Nestl.* Stirp. Crypt. Exsicc. No. 494.

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 sphæria-like subulate *ostiolæ* intermixed. *Pileus* 1 line broad; *hymenium* gently convex, black, furnished with a regular narrow border. External surface paler.

35. P. *Aucupariæ*, in roundish tufts; pilei stipitate, subturbinate, concave, with a rounded margin, intermixed with digitate or subulate processes. *Pers.* Mycol. v. 1. p. 327.

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.*

1. A. *furfuraceus*, sessile, gregarious, somewhat concave, olive-green or brownish, externally furfuraceous. *Pers.* Syn. Fung. t. 676. et Mycol. v. 1. p. 340. *Hook.* Fl. Scot. 2. p. 33. *Peziza stercoraria*, *Sow.* Fung. t. 18.

Hab. On old cow-dung, in pastures, &c. Extremely common.

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.

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.*

1. T. *mesenterica*, sessile, roundish, orange-yellow, variously lobed and plicate. *Pers.* Syn. Fung. p. 622. *Smith*, E. B. t. 709. *Hook.* Fl. Scot. 2. p. 32.

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

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* 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. clavariæformis*, *deliquescens* and *cruenta*, certainly do not belong to the genus.

gelatinous, yet rather tenacious, shrinking much in drying, when it becomes horny and of a darker colour.

2. T. *albida*, sessile, roundish, or spreading and somewhat expanded, obtusely lobed and plaited, whitish. *Smith*, E. B. t. 2117. *Hook.* Fl. Scot. 2. p. 31. *T. candida*, *Pers.* Syn. Fung. p. 624.

HAB. On dead branches of trees, not frequent. Autumn. Carlowrie.

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.

3. T. *arborea*, sessile, roundish, rather spreading, thick, not gyrose, plicate beneath, the surface bearing minute white-headed processes. *Smith*, E. B. t. 2448. *Hook.* Fl. Scot. 2. p. 31. *T. spiculosa*, *Pers.* Syn. Fung. p. 624.

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 flattish, undulated, sporuliferous.

4. T. *sarcoides*, "sessile, gelatinous, reddish-purple, at first club-shaped, then rounded, lobed, plaited or curled, finally blackish." *Smith*, E. B. t. 2450. *Hook.* Fl. Scot. 2. p. 32. *T. amethystea*, *Bull.* Champ. t. 499. f. 5.

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.

5. ? T. *clavariæformis*, gregarious, distinct, tender, gelatinous, simple, lingulate, dull orange, pulverulent toward the apex. *Pers.* Syn. Fung. p. 629. *Jacq.* Icon. Pl. t. 648.

HAB. On living stems of the common Juniper. Pentland Hills, abundantly. Summer and autumn.

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. Sabini* of English Botany.

** *Small.*

6. T. ? *diliquescens*, gregarious, entire, round, depressed, pulpy, orange-yellow. *Bull.* *T. lacrymalis*, *Pers.* Syn. Fung. p. 628.

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.

7. T. ? *cruenta*, deep purple, excessively minute, composed of distinct crowded granules containing roundish sporules. *Smith*, E. B. t. 1800. *Hook.* Fl. Scot. 2. p. 32.

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.*

1. P. *Rosæ*, hypophyllous; sporidia mucronated, 5–7 celled, with a white filiform stipes, incrassated towards the base, which is furnished with a yellow gland. *Grev.* Crypt. Fl. t. 15. *P. mucronata*, *α. Pers.* Syn. Fung. p. 230. *Hook.* Fl. Scot. 2. p. 17.

Hab. On the inferior surface of various roses, particularly *Rosa canina*, and *R. centifolia*. Autumn. Very common.

This species so often accompanies *Uredo Rosæ*, growing even from the midst of it, that it was once thought to be parasitical upon it.

2. P. *Rubi*, hypophyllous; deep black, tufted; sporidia 4-celled, obtuse, mucronate, stipes slender, incrassated at the base. *De Cand.* Fl. Franç. v. 2. No. 582. P. *mucronata*, *β*, *Pers.* Syn. Fung. p. 230. *Hook.* Fl. Scot. 2. p. 18.

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. Franç. v. 6. p. 54.

Hab. On the under side of the leaves of the Raspberry, *Rubus Idæus*. Autumn; rare about Edinburgh.

A very distinct species, differing in the greater number of dissepiments, both from P. *Rubi* and P. *Rosæ*; 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.

4. P. *Potentillæ*, somewhat tufted, scattered, black; sporidia cylindrical, 3–4-celled, obtuse, never mucronated; stipes filiform. *Grev.* Crypt. Fl. t. 57. *Pers.* Syn. Fung. p. 229. *Uredo obtusa*, *Strauss*, in Annal. Soc. Wetterav. v. 2. p. 107.

Hab. On the under surface of the leaves of *Potentilla Fragaria*, *argentea*, and *Tormentilla erecta*. Autumn. Near Edinburgh; Rosslyn, &c.

Very distinct from *P. Rosæ*, 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 Potentillæ*.

** *Sporidia 2-celled.*

5. P. *Asparagi*, roundish or ovato-oblong, scattered, black, somewhat convex; sporidia densely crowded, oblong, obtuse, firmly fixed by the pedicels. *De Cand.* Syn. Fl. Gall. p. 45. *Moug. et Nestl.* Pl. Exs. No. 392. *Hook.* Fl. Scot. 2. p. 17.

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.

6. P. *Circææ*, hypophyllous, deep pinkish-brown, prominent, consisting of a number of distinct aggregated tufts; sporidia oblongo-acute. *Pers.* Syn. Fung. p. 228. *Hook.* Fl. Scot. 2. p. 17.

HAB. On the inferior surface of the leaves of *Circæa 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 Circææ*, *Strauss*, in Annal. Soc. Wetterav. v. 2. p. 110.

HAB. On the inferior surface of the leaves of *Chrysosplenium oppositifolium*. May. Balmuto.

This species certainly resembles P. *Circææ* 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. *Circææ*, as well as its dark colour, is quite wanting in the present plant.

8. P. *Avicularieæ*, hypophyllous, punctiform, minutely tufted, subrotund, blackish-brown; sporidia crowded, obtusely egg-shaped, with a long flexuose filiform pedicel. *De Cand.* Fl. Franç. v. 2. No. 589. P. *Polygoni avicularieæ*, *Pers.* Syn. Fung. p. 227. *Alb. et Schw.* p. 132. *Hook.* Fl. Scot. 2. p. 17.

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

centre; stipes short. *Uredo Ægopodii, Strauss*, in Annal. Soc. Wetterav. v. 2. p. 101.

Hab. On the leaves of *Ægopodium podagraria*. June. Balmuto.

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, conglomerated, 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.

11. P. *Menthæ*, hypophyllous; round, scattered, nearly black; sporidia of an obtuse irregular figure, with a short filiform stipes somewhat incrassated at the base. *Pers.* Syn. Fung. p. 227. *Hook.* Fl. Scot. 2. p. 17.

Hab. On the under surface of the leaves of various *Menthæ*, 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 Menthæ* of Persoon to be the young state of *Puccinia Menthæ* of the same author.

12. P. *Polygoni*, hypophyllous; minute, round, very crowded, reddish-brown; upper cell of the sporidia thick, globose, the lower one long and narrow; stipes short. *Pers.* Syn. p. 227. *Hook.* Fl. Scot. 2. p. 17.

Hab. On the under surface of the leaves of *Polygonum amphibium*, var. *terrestris*, in the autumn. Common about Edinburgh.

Scattered irregularly over the whole leaf, in fuscous, 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. *Centaureæ*, 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,

scattered; sporidia short, with both cells obtuse, and a short stipes. *De Cand.* Fl. Franç. v. 6. p. 58, and *Uredo Athamanthæ*, v. 2. p. 228.

HAB. On the leaves of *Myrrhis odorata*, *Chærophyllum 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 *Selinum*, two species of *Pimpinella*, and on *Peucedaneum Parisiense*.

15. P. *Saniculæ*, 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. *Epilobii*, 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.

HAB. On the under side of the leaves of *Epilobium palustre*. June. Duddingston Loch.

I have never met with this elsewhere. It is remarkable for the form of its sporidia.

19. P. *Betonicæ*, 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.

Enc. Bot. v. 8. p. 247. *Uredo Betonicæ*, *Strauss* in Annal. Soc. Wetterav. v. 2. p. 99.

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*.

21. P. *Adoxæ*, on the leaf and petiol, crowded, confluent; sporidia dark brown, pulverulent, upper cell obtuse; stipes somewhat lengthened. *De Cand.* Fl. Franç. v. 2. p. 220.

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. *Primulæ*, hypophyllous; deep brown, solitary, scattered, or concentric and subconfluent; sporidia rather slender, with the lower cell attenuated into a short stipes.

Hab. On the under side of the leaves of *Primula vulgaris* in July. Near Kirkaldy, rare.

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.

23. P. *Violæ*, hypophyllous; minute, scattered, sometimes confluent, irregular in form, nearly black; sporidia short, obtuse, small, with a short stipes. *De Cand.* Fl. Franç. v. 6. p. 62.

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. *Valantiæ*, hypophyllous; very minute, scattered, deep brown; sporidia thick, obtuse, variable in shape, with the lower

cell fusiform. *Pers.* Syn. Fung. p. 227. *Hook.* Fl. Scot. 2. p. 17.

HAB. On *Galium verum* and *cruciatum*. Summer, not unfrequent.

When growing on the stem, it is of an 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 Jacobæa*, 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 of an iron grey colour before the epidermis is ruptured. The leaf is of a pale colour round the tufts.

26. P. *Ulmariæ*, hypophyllous; purplish black, scattered in tufts; sporidia variable, generally very obtuse, 2- rarely 3-celled, frequently also divided perpendicularly; stipes short. *De Cand.* Fl. Franç. v. 6. p. 56. *Uredo Rosæ β Ulmariæ, Strauss* in Annal. Soc. Wetterav. v. 2. p. 109.

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 Rosæ*.

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. oblongata* 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.

28. P. *Graminis*, tufts dense, oblong, often confluent and forming long parallel lines, changing from yellowish-brown to black; sporidia elongated, the upper cell the shortest, and of greater diameter; stipes filiform. *Pers.* Syn. Fung. p. 228. *Hook.* Fl. Scot. 2. p. 17. *Uredo Frumenti, Sow.* Fung. t. 140.

β Arundinis, long, broad; sporidia with the cells nearly equal, much contracted at the dissepiments; stipes very long and filiform. *Pers.* in Litt. Moug. et Nest. Pl. Exs. No. 292. *Uredo striola, Strauss* in Annal. Soc. Wetterav. v. 2. p. 105.

HAB. α on the culms and leaves of wheat and many of the larger grasses β 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 in Annals of Botany*, v. 2. p. 51, and *Kirby in Linn. Trans.* v. 5. p. 102.

*** *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 Fabæ*, which, however, is of a light brown.

161. UREDO. *Pers.*

* *Very dark, brown, or reddish.* (Nigredo.)

1. U. *Geranii*, hypophyllous, scattered, dark fuscous, round, very pulverulent, sometimes confluent; sporidia globose. *Schleich, De Cand.* Fl. Franç. v. 6. p. 73. *Grev.* Crypt. Fl. t. 8.

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 possess a minute stipes.

2. U. *Ficariæ*, aggregated, deep brown, chiefly hypophyllous, confluent; sporidia oval, sometimes with a very minute stipes. *Alb.* et *Schw.* p. 128. *De Cand.* Fl. Franç. v. 6. p. 65.

HAB. On the under surface and on the petiols of the leaves of *Ficaria ranunculoides*, in summer and autumn. Rosslyn and elsewhere in shady places.

Very pulverulent, and remarkably confluent. Before bursting, it has, as *Albertini* and *Schweiniz* observe, a bullated or swollen appearance.

3. U. *suaveolens*, hypophyllous, scattered, becoming confluent, reddish or purplish brown; sporidia globose, greenish under a high power of the microscope. *Pers.* Syn. Fung. p. 221. *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 globular. *Grev.* Crypt. Fl. t. 80. *De Cand.* Fl. Franç. v. 6. p. 71.

HAB. On the under surface of the leaves of *Polygonum amphibium*, *P. convolvulvus*, and *P. aviculare*, in summer and autumn. Common.

On *P. amphibium* and *aviculare*, this species generally occnrs in company with the *Puccinia*, peculiar to those plants. The sporidia are sometimes furnished with a minute pedicel.

5. U. *Primulæ*, 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.

HAB. On the lower surface of the leaves of *Primula vulgaris*, in July, rare. Balmuto. Between Pettycur and Kinghorn.

Often found along with *Puccinia Primulæ*, but is of a much paler colour.

6. U. *Cichoraceārum*, on both sides of the leaf, dark fuscous, minute, round, scattered; sporidia globular, rarely with a minute pedicel. *De Cand.* Fl. Franç. v. 2. p. 229. *U. flosculosorum*, *Alb.* et *Schw.* p. 128.

HAB. On the leaves of a great number of *Compositæ*; particularly *Leontodon taraxacum*, *Hieracium murorum*, *H. Lawsoni*, *H. sylvaticum*, *H. sabaudum*, *H. pilosella*, *Hypochæris radicata*, sometimes on *Lapsana communis*, in summer and autumn; extremely common.

A common plant, and probably to be found on most of the European *Compositæ*. 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 *Leontodon 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.

HAB. On the lower surface of the leaves of *Heracleum Sphondylium*, in June. Near Kirkcaldy and elsewhere, not uncommon.

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. Rumicum*, *var. β. Rumicis acetosæ*, *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. Rumicum*, in his Supplement to the *Flore Française*, 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. Rumicum*, 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

suspected was not distinct, but retained his name for the species now described, and which he also thought a variety of *U. Rumicum.*

9. U. *Rumicum*, on both sides of the leaf, brown, round, minute, often not bursting the epidermis, rarely disposed in a circle; sporidia ovoid, sometimes with minute pedicels. *De Cand.* Fl. Franç. v. 6. p. 66. *U. bifrons*, Fl. Franç. v. 2. p. 229.

HAB. On the leaves of *Rumex crispus* and *obtusifolius*, in autumn. Near Edinburgh. About Foxhall, Captain Wauch.

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.

10. U. *Fabæ*, scattered, round, depressed, light brown, girt with the remains of the epidermis; sporidia rounded or suboval, rarely with minute pedicels. *Grev.* Crypt. Fl. t. 95. *Pers.* Syn. Fung. p. 221.

HAB. On the leaves and petiols of *Vicia Faba*, in autumn. Foxhall, Captain Wauch. About Edinburgh, not unfrequent.

According to De Candolle, this plant is common to a great number of European *Leguminosæ*. 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. Fabæ* 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.

11. U. *Labiatarum*, hypophyllous, pale, yellowish-brown, sometimes disposed in a circle round a central one, minute, rarely confluent; sporidia roundish or egg-shaped, and rather hyaline. *De Cand.* Fl. Franç. v. 6. p. 72. *U. Menthæ*, *Pers.* Syn. Fung. p. 220. *Hook.* Fl. Scot. 2. p. 15.

HAB. On the leaves of various *Labiatæ*, particularly *Mentha arvensis*, *aquatica*, *piperata* and *rotundifolia*, in summer and autumn. Balmuto. 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 Menthæ*, 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 *Pucciniæ* are more compact than the *Uredines*, 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. Alchemillæ*, from which it differs in every respect, but chiefly in form and colour.

13. U. *oblongata*, on both sides of the leaf, scattered, distinct, oblong, reddish-brown, girt by the ruptured epidermis; sporidia subglobose, rarely subpedicelled. *Link. Grev.* Crypt. Fl. t. 12. *U. caricina*, *De Cand.* Fl. Franç. v. 6. p. 83.

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*; probably the result of an imperfect evolution. A similar instance often occurs in *Æcidium 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.)

14. U. *Salicis*, hypophyllous, scattered, very minute, rounded, becoming contiguous, but not confluent; sporidia pyriform, subpedicellate. *De Cand.* Fl. Franç. v. 2. p. 250.

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. *Vitellinæ*, hypophyllous, very minute, convex, orbicular, scattered, becoming confluent; sporidia very minute, globular, transparent. *De Cand.* Fl. Franç. v. 2. p. 231.

HAB. On the inferior surface of the leaves of *Salix vitellina*, *mollissima*, and *viminalis*, in autumn. Old Botanic Garden, Edinburgh. Rosslyn woods and elsewhere.

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.

16. U. *farinosa*, hypophyllous, pale ochrey yellow, distinct at first, soon bursting, becoming confluent and very pulverulent; sporidia oval. *Pers.* Syn. Fung. p. 217., *var.* α. *Hook.* Fl. Scot. 2. p. 15. *U. Caprearum*, *De Cand.* Fl. Franç. v. 6. p. 80.

HAB. On the under side of the leaves of *Salix Capræa*, 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.

17. U. *Tussilaginis*, hypophyllous, bright orange-yellow, prominent, crowded, generally forming circles, and becoming very confluent; sporidia very numerous, subovate. *Pers.* Syn. Fung. p. 218. *Hook.* Fl. Scot. 2. p. 15.

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*.

18. U. *Senecionis*, hypophyllous, orange-yellow, oblong, irregular, becoming confluent; sporidia numerous. *De Cand.* Fl. Franç. v. 2. p. 231. *U. farinosa*, β. *Pers.* Syn. Fung. p. 218.

Hab. On the lower surface of the leaves of *Senecio viscosus* and *S. sylvaticus*, in summer. Braid Hill, B. D. Greene, Esq. King's Park, Edinburgh.

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.

19. U. *confluens*, hypophyllous, depressed, yellow, oblong, concentric, becoming confluent; sporidia nearly oval. *Pers.* Syn. Fung. p. 214. *var.* β. *De Cand.* Fl. Franç. v. 2. p. 233.

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 Schweiniz, are probably right in identifying the present species with that which is found on several *Orchideæ*.

20. U. *Potentillæ*, chiefly hypophyllous, golden yellow, scattered, irregular, convex, becoming confluent; sporidia subspherical. *De Cand.* Fl. Franç. v. 2. p. 232.

Hab. On *Potentilla Fragaria*, in summer. Balmuto. Rosslyn woods.

Of a very bright colour, extremely pulverulent, and often accompanied by *Puccinia Potentillæ*.

21. U. *Rosæ*, hypophyllous, small, scattered, effused, orange-yellow; sporidia suboval, sometimes with a minute pedicel. *Pers.* Syn. Fung. p. 215. *De Cand.* Fl. Franç. v. 2. p. 232.

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 Rosæ*, 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.

22. U. *Ruborum*, hypophyllous, golden yellow, suborbicular, becoming effused; sporidia very numerous, irregularly spherical. *De Cand.* Fl. Franç. v. 2. p. 234. *U. Rubi fruticosi*, *Pers.* Syn. Fung. p. 218.

HAB. On the under surface of the leaves of *Rubus fruticosus* and *Coryli-folius*; very common in summer and autumn.

Of a rich deep yellow colour, very pulverulent, often growing along with *Puccinia Rubi*. The sporidia are dark and granular within, and in a favourable light appear obscurely reticulated.

23. U. *effusa*, bright reddish orange, broad, pulverulent, hypophyllous, and on the nerves and petiols; sporidia numerous, subglobose. *Strauss* in Annal. Soc. Wetterav. v. 2. p. 91. *Grev.* Crypt. Fl. t. 19. *U. miniata*, var. *α. Pers.* Syn. Fung. p. 216.

HAB. On the nerves and petiols of the leaves of *Spiræa Ulmaria*, 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.

24. U. *gyrosa*, epiphyllous, much scattered, rather large, yellow, thick, elevated from the leaf, and bursting in a gyrose manner; sporidia subglobose. *Rebentisch*, Fl. Neomarch. No. 1212. *U. Rubi Idæi*, *Pers.* Syn. Fung. p. 218.

HAB. On the superior surface of the leaves of the Raspberry (*Rubus Idæus*), 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.

25. U. *Alchemillæ*, hypopyllous, linear-oblong, crowded, arranged in a subparallel manner, orange-yellow, becoming pale; sporidia spherical. *Pers.* Syn. Fung. p. 215. *Hook.* Fl. Scot. 2. p. 14.

HAB. 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.

26. U. *Rhinanthacearum*, hypophyllous, and on the petioles and calyx, oblong, thickish, sometimes partly disposed in a circular manner, and subconfluent, deep reddish-yellow; sporidia spherical. *De Cand.* Fl. Franç. v. 6. p. 80. *U. tremellosa*, *var. δ. Strauss* in Annal. Soc. Wetterav. 2. p. 90.

HAB. On *Euphrasia officinalis* and *Bartsia odontites*, in summer and autumn. Pentland Hills.

On the Continent this species has been found on several angiospermous plants of the class Didynamia. De Candolle mentions having seen a field in which every individual of the natural family *Rhinanthaceæ* was attacked with it; but every other escaped.

27. U. *Lini*, on both sides of the leaf and stem, suborbicular, prominent, bright orange-yellow, scattered; sporidia oval or even oblong, transparent. *Grev.* Crypt. Fl. t. 31. *De Cand.* Fl. Franç. v. 2. p. 234. *U. miniata*, *var. β. Pers.* Syn. Fung. p. 216.

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 *Saxifragæ*. 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.

29. U. *Campanulæ*, hypophyllous, scattered, round, depressed, rarely confluent; sporidia yellowish-orange, spherical, surrounded by the remains of the ruptured epidermis. *Pers.* Syn. Fung. p. 217. *U. tremellosa, var. β. Strauss* in Annal Soc. Wetterav. v. 2. p. 90.

HAB. On the inferior surface of the leaves of various species of *Campanula*, in summer. Balmuto. Salisbury Craigs.

Colour bright when in a recent state; soon after drying becoming quite pale. De Candolle observes that it grows on almost all the *Campanulæ*.

30. U. *Pyrolæ*, hypophyllous, punctiform, scattered or collected into small clusters, golden-yellow, scarcely bursting; sporidia ovate or oblong, somewhat transparent and granular within. *U. polymorpha, var. ε. 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.

31. U. *Helioscopiæ*, hypophyllous, golden-yellow, scattered, distinct, surrounded by the remains of the ruptured epidermis; sporidia subglobose, minute. *De Cand.* Fl. Franç. v. 2. p. 232. *U. Euphorbiæ Helioscopiæ*, *Pers.* Syn. Fung. p. 215. *var. α. Hook.* Fl. Scot. 2. p. 14.

HAB. On the lower surface of the leaves of *Euphorbia Helioscopia*, 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 *Xyloma*, but are probably nothing more than the inspissated juice of the plant.

32. U. *linearis*, on both sides of the leaf, oblong or linear, sometimes forming long lines, yellow, becoming reddish or brownish in decay; sporidia globular or suboval. *Pers.* Syn. Fung. p. 216. *Hook.* Fl. Scot. 2. p. 15. *U. frumenti, Sow.* Fung. t. 140. and *U. longissima*, t. 139.

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 Menthæ*.

33. U. *æcidiiformis*, 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.

34. U. *Cerastii*, chiefly hypophyllous, very minute, regular, numerous, convex, late in bursting, golden-yellow; sporidia roundish, oval or even oblong. *U. pustulata, var. β. Pers.* Syn. Fung. p. 219.

Hab. On the leaves of *Cerastium viscosum*, in summer. About Edinburgh, B. D. Greene, Esq. King's Park, by the ditch-sides.

Punctiform, sometimes spreading without being confluent, over the whole leaf, and giving it a deep golden-yellow colour.

35. U. *pustulata*, chiefly hypophyllous, very minute, pale yellow, subrotund, convex, scattered, or collected into clusters, scarcely bursting; sporidia suboval. *Pers.* Syn. Fung. p. 219. exclud. var. *β*. *De Cand.* Fl. Franç. v. 6. p. 85. var. *α*.

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.

36. U. *Sonchi*, hypophyllous, depressed, irregular in form, reddish-orange, scattered, becoming partially confluent; sporidia egg-shaped. *U. Sonchi arvensis Pers.* Syn. Fung. p. 217. *Hook.* Fl. Scot. 2. p. 15. *U. tremellosa, var. γ. Strauss* in Annal. Soc. Wetterav. v. 2. p. 90.

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.

37. U. *Petasites*, hypophyllous, minute, depressed, spreading, somewhat aggregated, subconfluent, irregular in form, of a deep orange or orange-red; sporidia oval. *De Cand.* Fl. Franç. v. 2. p. 236. *U. circinalis*, var. *ε*, *Strauss* in Annal. Soc. Wetterav. v. p. 89.

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. circinalis*. 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.

38. U. *Populina*, hypophyllous, scattered or crowded, distinct, convex, roundish, large compared with the following, mostly closed, pale, becoming golden-yellow; sporidia very long, obtuse at each extremity. *Pers.* Syn. Fung. p. 219. var. α. *Hook.* Fl. Scot. 2. p. 15. var. α. *U. cylindrica*, *Strauss* in Annal. Soc. Wetterav. v. 2. p. 92. t. 11. f. 5.

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.

39. U. *ovata*, hypophyllous, punctiform, prominent, or papilliform, numerous, tawny yellow, mostly closed; sporidia ovate. *Strauss* in Annal. Soc. Wetterav. v. 2. p. 92. t. 11. f. 6.

β. *Betulæ*, colour brighter, more numerous, spreading often on a yellow ground. *U. populina*, *var.* β. *Pers.* Syn. Fung. p. 219. *Hook.* Fl. Scot. 2. p. 15. *U. longicapsula*, *var.* β. *De Cand.* Fl. Franç. v. 6. p. 84.

Hab. α. 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.)

40. U. *candida*, polymorphous, of various forms, sometimes disposed in a circular manner, quite white, frequently never bursting; sporidia in great profusion, globular, transparent under the microscope. *Pers.* Syn. Fung. p. 223. *Uredo Thlaspi*, *Sow.* Fung. t. 340. *U. cruciferarum*, *De Cand.* Syn. p. 49.

Hab. On plants belonging to the Natural Order *Cruciferæ*, (Class *Tetradynamia*, 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 armoriaca*, 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. *Segetum*, within the fruit and glumes of corn, and va-

rious grasses, spreading, and in a short time filling the whole with a profuse black dust, which, under the microscope, consists of minute spherical sporidia. *Pers.* Syn. Fung. p. 224. *Hook.* Fl. Scot. 2. p. 15.

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. *urceolorum*, 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. Caricis*, *Pers.* Syn. p. 225.

Hab. On the fructification of several species of Carex, as *C. præcox*, *stellulata* and *panicea*. Summer; not very common.

Not unfrequently a line or two in diameter, and nearly globose.

43. U. *caries*, always inclosed within the grain, and filling it with a uniform, dense, fœtid, 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 fœtid smell; it is supposed to be a new genus by Ditmar, from the sporules being contained, according to him, in a true peridium.

44. U. *antherarum*, attacking the anthers and germen of the *Caryophylleæ*, fine purple; sporidia very plentiful, pulverulent, minute and globular. *De Cand.* Fl. Franç. v. 6. p. 79. *U. violacea*, *Pers.* Syn. Fung. p. 225.

Hab. On various *Caryophylleæ*. About Edinburgh, on *Lychnis dioica*, and *Cerastium viscosum*. Summer.

Sporidia resembling those of *U. Segetum*, under the microscope, and equally minute.

45. U. *flosculorum*, sporidia very minute, purplish-brown, plentiful, produced within the florets, and often filling them with a pulverulent mass. *De Cand.* Fl. Franç. v. 6. p. 79. *Farinaria Scabiosæ*, *Sow.* Fung. t. 396. f. 2.

Hab. On *Scabiosa arvensis*. Summer. About Edinburgh.

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.*

1. Æ. *Pini*, large, oblong or conical, much scattered, pale orange, bursting with an irregular orifice; sporidia excessively abundant, bright orange. *Pers.* Syn. Fung. p. 213. *Grev.* Crypt. Fl. t. 7.

HAB. On the leaves and small branches of *Pinus sylvestris* in summer. Drumshoreland 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.

2. Æ. *Epilobii*, hypophyllous, numerous, distinct, peridia very white, toothed; teeth beautifully rolled back, brittle and vanishing; sporidia pinkish-orange. *De Cand.* Fl. Franç. v. 2. p. 238.

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 Granton 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. Periclymeni*, 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.

Hab. On the under surface of the leaves of *Lonicera Periclymenum*, from June to August. Rosslyn woods, rare.

A species intermediate between the Genera *Rœstelia* 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. Periclymeni* is known at first sight by a large yellow spot on the upper surface of the leaf, which is not unfrequently accompanied by a sphacellated or brown decayed portion.

7. *Æ. Bunii*, hypophyllous and on the petiols, irregularly clustered, and deforming the part on which it grows; peridia somewhat indistinct, round, prominent, and yellowish, with a subentire orifice. *De Cand.* Syn. Fl. Gall. p. 51. Enc. Bot. 8. p. 241.

Hab. 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. Jacobææ*, hypophyllous, at first prominent, pustular, soon becoming agglomerated, very numerous; peridia splitting into short, brittle, yellowish-white teeth; sporidia pale orange.

Hab. On the lower surface of the leaves of *Senecio Jacobæa*, from June to August. Between Pettycur and Burntisland.

The agglomerated clusters large, depressed, numerous; rendering the leaf yellowish on the superior surface.

9. *Æ. Prenanthis*, hypophyllous, in widely scattered agglomerated clusters, but not very crowded; peridia subsessile, split into very white, exceedingly brittle teeth; sporidia pale. *Pers.* Syn. Fung. p. 208. *De Cand.* Fl. Franç. v. 2. p. 244.

Hab. On the under surface of the leaves of *Hieracium sylvaticum*. Summer, rather rare. Balmuto. Rosslyn woods.

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.

10. *Æ. Urticæ*, hypophyllous and on the petiols and stem; peridia campanulate, agglomerated, rarely single, split into many short recurved teeth; sporidia ochre-yellow, numerous, ovate. *De Cand.* Fl. Franç. v. 2. p. 243.

Hab. On *Urtica dioica*. May and June. Duddingston Loch.

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.

11. Æ. *confertum*, hypophyllous and on the petiols; peridia in dense agglomerated clusters, whitish, split into revolute teeth; sporidia yellowish, the leaf whitish around the clusters. *De Cand.* v. 2. p. 245. *Æ. Ficariæ*, *Pers.* Obs. Mycol. v. 2. p. 23. *Æ. crassum*, *var. β. Pers.* Syn. Fung. p. 208.

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. *Grossulariæ*, 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.

13. Æ. *Ranunculacearum*, hypophyllous; peridia agglomerated in scattered clusters of various sizes, whitish, with a brittle dentated margin; sporidia yellow. *De Cand.* Fl. Franç. v. 6. p. 97. *Æ. Ranunculi acris*, *Pers.* Syn. Fung. p. 210.

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. *Calthæ*, 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.

15. Æ. *Berberidis*, hypophyllous and on the fruit-stalk, seed-vessel, calyx, and even petals; peridia short or elongated, cylindrical, densely crowded, fine orange; sporidia yellow under the microscope, profuse. *Grev.* Crypt. Fl. t. 97. *Pers.* Syn. Fung. p. 246. *Hook.* Fl. Scot. 2. p. 14. *Sow.* Fung. t. 397. f. 5.

HAB. On *Berberis vulgaris.* May—July. Not uncommon. Carlowrie.

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.

16. *Æ. laceratum*, hypophyllous and on the petiols and young fruit; peridia elongated, agglomerated, brown, splitting to the base in capillary segments; sporidia numerous, light brown. *De Cand.* Fl. Franç. v. 2. p. 247. *Sow.* Fung. t. 318. *Æ. Oxyacanthæ, Pers.* Syn. Fung. p. 206.

HAB. On *Cratægus Oxyacanthus.* Summer, James Heriot, Esq.

The part on which this parasite grows is always swollen and deformed, and the plant is partly immersed as if in a receptacle.

17. *Æ. cornutum*, hypophyllous; peridia 2–12, long, cylindrical, slightly curved, yellowish-brown, springing from an orange-coloured thickened portion of the leaf; sporidia numerous, greyish, becoming brown. *Pers.* Syn. Fung. p. 205. *Sow.* Fung. t. 319. *Hook.* Fl. Scot. 2. p. 14.

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.*

18. *Æ. Tussilaginis*, hypophyllous, marked on the upper surface of the leaf by a yellow or purplish spot; peridia partly immersed, short, splitting into white revolute teeth; sporidia beautiful pink-orange. *Pers.* Syn. Fung. p. 209. *Sow.* Fung. t. 397. f. 1. *(bad).* *Hook.* Fl. Scot. 2. p. 14.

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.

19. *Æ. rubellum*, hypophyllous, producing a crimson spot on the upper surface of the leaf; peridia minute, subimmersed, splitting regularly into small revolute white teeth; sporidia yellowish-white. *Gmel. De Cand.* Fl. Franç. v. 2. p. 241. *Æ. Rumicis, var. α. Pers.* Syn. Fung. p. 207. *Sow.* Fung. t. 405.

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*, hypophyllous, 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-

lowish-white teeth; sporidia pale. *Æ. Allii ursini*, *Pers.* Syn. Fung. p. 210.

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.*

1. S. *vulgare*, head roundish, whitish, semifluid, becoming firmer and yellowish; stipes rather thick, cylindrical. *Tode*, Fung. Meckl. t. 2. f. 16. *Pers.* Syn. Fung. p. 682.

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.*

1. P. *crystallinus*, stem-like receptacle, inflated upwards, (rarely filiform), pointed; capitular vesicle, round, depressed, black. *Pers.* Syn. Fung. p. 117. *Hook.* Fl. Scot. 2. p. 9. *Mucor urceolatus*, *Sow.* Fung. t. 300.

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.*

1. A. *mucedo*, stipes simple, heads inflated, spherical, dark grey, bursting close to the stipes, which is long and filiform. *Link* in Berl. Mag. 3. p. 30. t. 2. f. 43. *Mucor mucedo*, *Pers.* Syn. Fung. p. 201. *Sow.* Fung. t. 378. f. 5, 6, 7. *Hook.* Fl. Scot. 2. p. 13.

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.*

1. M. *stercorea*, byssus-like, white, becoming yellowish; stipes erect, tall, lax, simple, bearing a minute subglobose head. *Hydrophora stercorea*, *Tode*, Fung. Meckl. 2. p. 7. *Mucor caninus*, *Pers.* Syn. Fung. p. 201.

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 *Ascophora mucedo*, and Sowerby's Fig. t. 378. f. 6, 7., from wanting dissections or magnified figures, might pass for either plant.

167. ERINEUM. *Pers.*

* *Peridia very minute, forming a velvety spot.*

1. E. *aureum*, on either surface of the leaf, bright gold-colour, effused, sometimes spreading over the whole leaf; peridia simple, crowded, club-shaped; sporules evident, excessively minute, yellow. *Grev.* in Edin. Phil. Journ. v. 6. p. 81. t. 3. f. 15. *Pers.* Syn. Fung. p. 700. et Mycol. v. 1. p. 8. *Kunze*, Mykol. Hefte, 2. p. 133.

HAB. On the leaves of *Populus nigra;* in summer. Carlowrie, and elsewhere about Edinburgh.

The only species of a bright yellow colour.

2. E. *griseum*, hypophyllous, so minute as scarcely to be raised above the surface of the leaf; pale obscure purple, widely effused; peridia simple, obtusely club-shaped. *Pers.* Mycol. v. 1. p. 8. *Kunze*, Mykol. Hefte, 2. p. 135. *E. minutissimum*, *Grev.* in Edin. Phil. Journ, v. 6. p. 81. t. 3. f. 17.

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.*

3. E. *acerinum*, on the under surface of the leaf, depressed, distinct or confluent, pale, becoming reddish-brown; peridia club-shaped, very rarely turbinate, flaccid, the upper half often inclined. *Grev.* in Edin. Phil. Journ. v. 6. p. 73. t. 2. f. 1. et 6. *Pers.* Syn. Fung. t. 700. et Mycol. v. 1. p. 6. *Hook.* Fl. Scot. 2. p. 34. *Kunze*, Mykol. Hefte, 2. p. 163.

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 maturity it is sometimes of a fine pale sulphur colour.

4. E. *pyrinum*, mostly on the under surface of the leaf, scattered, subeffused, rich reddish-brown: peridia compressed, linear, somewhat lax, with the apex club-shaped, and often truncate. *Grev.* Crypt. Fl. t. 22. *Pers.* Syn. Fung. p. 700. et Mycol. v. 1. p. 4. *Kunze*, Mykol. Hefte, 2. p. 156.

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.

5. E. *tortuosum*, mostly on the under surface, irregularly tufted, whitish, becoming ferruginous; peridia linear, cylindrical, twisted, with rounded summits. *Grev.* in Edin. Phil. Journ. v. 6. p. 74. t. 2. f. 2. et Crypt. Fl. t. 94. *Kunze*, Mykol. Hefte, 2. p. 158.

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.

6. E. *Juglandis*, hypophyllous, silky or tomentose, pale, quadrangular; peridia erect, cylindrical, long and attenuated to a point. *De Cand.* Fl. Franç. v. 6. p. 15. ex. *Scleich.* Plant. Exsic. No. 92. *Kunze*, Mykol. Hefte, 2. p. 170. *E. subulatum*, *Grev.* in Edin. Phil. Journ. v. 6. p. 75. t. 2. f. 4. *E. Juglandinum*, *Pers.* Mycol. v. 1. p. 2.

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.

7. E. *clandestinum*, on the under surface, whitish-pink, becoming subferruginous, rarely in the form of spots or tufts, but confluent at the margin of the leaf, which is rolled inwards, and conceals it; peridia short, ovate or club-shaped. *Grev.* in Edin. Phil. Journ. v. 6. p. 76. t. 2. f. 8. *Kunze*, Mykol. Hefte, 2. p. 144. *E. Oxyacanthæ*, *Pers.* Mycol. v. 1. p. 7.

Hab. On the inferior surface of the leaves of *Cratægus 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.

8. E. *alneum*, on the under surface, irregularly tufted, or effused and confluent, whitish, at length dark reddish-brown; peridia shortly branched; branches thick, bearing several round or ovate lobes. *Grev.* in Edin. Phil. Journ. v. 6. p. 77. t. 2. f. 7. *Pers.* Syn. Fung. p. 701. et Mycol. v. 1. p. 7. *Hook.* Fl. Scot. 2. p. 34. *Kunze*, Mykol. Hefte, 2. p. 145.

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 heads, or rather lobes, in which sporules are sometimes to be perceived.

9. E. *roseum*, mostly on the upper surface, unequally scattered, confluent, fine crimson; peridia polymorphous, turbinate, club-shaped or capitate, the summit frequently truncate. *Schultz. Kunze*, Mykol. Hefte, 2. p. 15. *E. Betulæ, Grev.* in Edin. Phil. Journ. v. 6. p. 77. t. 3. f. 9. et Crypt. Fl. t. 21. *E. betulinum, Pers.* Mycol. v. 1. p. 6. in part.

HAB. On the upper surface of the leaves of *Betula alba*; summer. Ravelrig-toll moss; Rosslyn woods, and elsewhere.

Of a splendid crimson colour, which becomes rather dingy in age.

10. E. *betulinum*, mostly on the under surface, whitish, at length dark ferruginous, often confluent; peridia short, polymorphous, sometimes turbinate, but generally with two blunt horn-like patent summits. *Rebent.* Prod. Fl. Neomarch. *Moug.* et *Nest.* No. 200. *Grev.* in Edin. Phil. Journ. v. 6. p. 79. t. 3. f. 16. *Kunze*, Mykol. Hefte, 2. p. 149.

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.?*

1. L. *circumcissa*, gregarious, sessile, yellowish or chesnut-brown, subglobose; the upper half of the peridium separating like a lid; sporules rarely mixed with one or two filaments. *Pers.* Syn. Fung. p. 196. *Hook.* Fl. Scot. 2. p. 13. *Sphærocarpus sessilis, Sow.* Fung. t 258., (*a bad fig. if really this plant*).

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.

2. L. *fragiformis*, peridia cylindrical, very fragile, densely crowded, forming a roundish or hemispherical mass, dull red, changing to pale brown: sporules brown, in the form of a minute, abundant dust. *Nees*, Syst. p. 28. t. 8. f. 102. *Tubulina fragiformis, Pers.* Syn. Fung. p. 198. *Sphærocarpus fragiformis, Bull.* p. 141. t. 384.

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.*

1. Sp. *alba*, effused, frothy; peridium furnished internally with horn-like grey processes, inclosing brown sporules. *Spumaria mucilago, Pers.* Syn. Fung. p. 163. *Reticularia alba, Bull.* t. 326. *Sow.* Fung. t. 280.

HAB. On rotten wood, grass, leaves, &c. Autumn. Very common. Foxhall, Captain Wauch. Swanston wood, &c.

Very unequally 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.*

1. R. *lutea*, effused, of a roundish form, yellow, at first resembling a light froth, becoming firmer, with an unequal, somewhat cottony surface. *Sow.* Fung. t. 399. f. 2. *Fuligo flava, Pers.* Syn. Fung. p. 161. *Hook.* Fl. Scot. 2. p. 12. *Æthalium flavum, Link.*

HAB. On leaves, mosses, grass, &c. in autumn.

Reducing itself to powder on the slightest touch when mature. *Sporules* dark blackish brown.

2. R. *hortensis*, soft and pulpy when young, either distinct or in the form of veins, quickly becoming confluent, and forming large pulverulent branny masses of a reddish-yellow colour, cellular and subfibrous within. *Bull.* p. 86. t. 424. f. 2. *(excellent.) Sow.* Fung. t. 399. f. 1. *Fuligo vaporaria, Pers.* Syn. Fung. p. 161. *Hook.* Fl. Scot. 2. p. 12.

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.*

1. L. *miniata*, globular, gregarious, red, changing to brown; sporules orange-red, at length purple-grey. *Grev.* Crypt. Fl. t. 38. *Pers.* Syn. Fung. p. 158. *Hook.* Fl. Scot. 2. p. 11. *Lycoperdon epidendrum, Sow.* Fung. t. 52.

HAB. On rotten wood, very frequent. Auchindenny. Dundas Hill. Craiglockhart, &c. Spring to autumn.

Pretty regular in form; under a lens minutely granular. Well marked by its colour.

2. L. *argentea*, large, suboval, very fragile, silvery white; sporules profuse, deep brown; filaments few. *Pers.* Syn. Fung. p. 157. *Hook.* Fl. Scot. 2. p. 11. *Reticularia Lycoperdon*, *Sow.* Fung. t. 272.

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.

3. L. *minuta*, minute, white, roundish, depressed, rarely confluent, fragile; sporules black, intermixed with a few filaments. *Grev.* Crypt. Fl. t. 40.

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.*

1. D. *globosum*, sessile, subglobose, smooth, greyish-white; both of the peridia fragile; sporules globular. *Pers.* Syn. Fung. p. 167. *Sturm's* Deutschl. Fung. t. 6. *Hook.* Fl. Scot. 2. p. 12.

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.*

1. L. *vernicosus*, shortly stipitate, obovate, reddish-brown, shining, crowded, stipes whitish. *Link.* in Berl. Mag. 3. p. 25. *Diderma vernicosum*, *Pers.* Syn. Fung. p. 165. *Lycoperdon fragile*, *Sow.* Fung. t. 136.

HAB. On the stems of grasses, mosses, &c. Pentland Hills, and Swanston Wood. Autumn.

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 chesnut.

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.

HAB. On rotten wood. Spring and autumn. Swanston Wood, Pentland Hills, and elsewhere.

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.

2. Ph. *nutans*, head globose, flattish beneath, bluish-grey, nodding; stipes thin, weak, whitish, not furrowed; sporules and filaments dark brown. *Pers.* Syn. Fung. p. 171. *Link* in Berl. Mag. v. 3. p. 27. *Sphærocarpus albus*, *Bull.* t. 407. f. 3.

HAB. On rotten wood and trunks of trees. Autumn. Braid Hermitage; probably common.

The unfurrowed stipes chiefly separates this from the preceding; but the head also droops far more.

3. Ph. *nigripes*, head globose, dark grey; stipes long, firm, black; sporules and filaments very dark. *Link* in Berl. Mag. v. 3. p. 27. *Sturm's* Fung. t. 42.

HAB. On rotten wood. Autumn. Damp woods about Edinburgh, as Slateford, &c.; rare.

Sufficiently distinguished by its black, firm, thin stipes.

4. Ph. *viride*, subglobose, umbilicate beneath, yellowish-green; stipes slender, rather weak, brownish; sporules and filaments very dark. *Pers.* Syn. Fung. p. 172. *Sturm's* Fung. t. 24. *Sphærocarpus viridis*, *Bull.* t. 481. f. 1.

HAB. On rotten wood. Autumn. Swanston wood on the remains of a fallen fir-tree.

Stipes rather weak towards the summit, and never of a pink colour, in which this species strikingly differs from *Ph. psittacinum*.

5. Ph. *leucopus*, head globoso-depressed, pale glaucous; stipes very short, thick, pale, at length brownish. *Link* in Berl. Mag. v. 3. p. 27.

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.*

1. T. *reticulata*, effused, forming an irregular sort of reticulation, yellowish or pale brown. *Pers.* Syn. Fung. p. 182, et Icon. Fung. fasc. 2. p. 46. t. 12. f. 1. *Nees*, Syst. t. 10. f. 111.

HAB. On rotten wood. Autumn. Caroline Park.

Pulpy, and becoming confluent in small lines while young, thus forming irregular interstices. *Peridium* very thin.

** *Ovate.*

2. T. *ovata*, crowded, obovate, ochrey-yellow, bursting at the summit. *Pers.* Syn. Fung. p. 180. *Hook.* Fl. Scot. 2. p. 12. *Trichia turbinata*, *Sow.* Fung. t. 85.

HAB. On rotten wood, leaves, sticks, &c. in woods. Autumn. Auchindenny woods.

Very much crowded, and, after the sporules and filaments have escaped, resembling minute cups.

1. T. *fallax*, shortly stipitate, reddish, at length yellowish, bursting at the apex, plicate beneath. *Pers.* Syn. Fung. p. 177. *Sphærocarpus fragilis*, *Sow.* Fung. t. 279. *Sph. ficoides*, *Bull.* t. 417. f. 3.

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.*

1. L. *floriforme*, yellow, globose, stipitate; peridium splitting into lobes, which are beautifully expanded and reflexed. *Link* in Berl. Mag. v. 3. p. 26. *Sphærocarpus floriformis*, *Bull.* t. 371. *Diderma floriforme*, *Pers.* Syn. Fung. p. 164.

HAB. On decaying trunks of trees, mosses, &c. Autumn. Swanston wood.

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.*

1. A. *punicea*, gregarious, often cæspitose, stipitate, dull crimson; sporules abundant, crimson red. *Pers.* Syn. Fung. p. 185. *Hook.* Fl. Scot. 2. p. 13. *Trichia cinnabarina*, *Bull.* t. 502. *Trich. denudata*, *Sow.* Fung. t. 29.

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.

2. A. *nutans*, pale yellow, substipitate, cylindrical, long, weak, drooping, *A. flava*, *Pers.* Syn. Fung. p. 184. *Hook.* Fl. Scot. 2. p. 13. *Trichia nutans*, *Bull.* t. 502. *Sow.* Fung. t. 260.

HAB. On rotten wood. Summer and autumn. Foxhall, Captain Wauch. Swanston and Auchindenny woods.

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.

178. STEMONITES. *Gmel. Pers.*

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-

dium. *Pers.* Syn. Fung. p. 187. *Hook.* Fl. Scot. 2. p. 13. *Trichia nuda*, *Sow.* Fung. t. 50.

Hab. On rotten wood, moss, &c. in shaded places. Summer and autumn. Foxhall, Captain Wauch. Balmuto. About Edinburgh, very frequent.

Pale when very young; when mature perfectly cylindrical, of various lengths, sometimes even 1 inch, including the stipes. *Subjacent membrane* very thin, shining.

2. 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.

Hab. On rotten wood. Foxhall, Captain Wauch. Autumn.

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. *Trentepohl.*

1. C. *leucocephalum*, cup-shaped, reddish-brown; operculum convex, whitish, very thin, evanescent; filaments white; sporules very dark. *Grev.* Crypt. Fl. t. 65. *Ditmar* in Sturm's Fung. t. 11. *Arscyria? leucocephala*, *Pers.* Syn. Fung. p. 183. *Hook.* Fl. Scot. 2. p. 13.

Hab. On mosses and stems of grass, &c. Pentland Hills. Foxhall, Messrs Wauch and Greville. Autumn.

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, chesnut colour; operculum firm, white; stipes orange; sporules blackish. *Ditmar* in Sturm's Fung. t. 9. *Cyathus minutus*, *Sow.* Fung. t. 239. lowest fig.

Hab. On mosses, sticks, leaves, and rotten wood, in autumn. Woods about Edinburgh.

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 *Sphærocarpus 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.*

180. LYCOPERDON. *Mich.*

1. L. *bovista*, large, obconical, soft, whitish, plicate beneath, scales broad, often indistinct. *Pers.* Syn. Fung. p. 141. *Hook.*

Fl. Scot. 2. p. 11. *Lyc. Proteus*, *Sow.* Fung. t. 332, upper figure.

HAB. Pastures. About Edinburgh. Autumn.

Turbinate or broadly obconical, 3–4 inches broad. After maturity the upper half vanishes by degrees; and after the sporules have escaped, the remainder is peziziform and permanent. The scales are very variable, sometimes almost obsolete. *Colour* at first very white, afterwards dark. I should not be surprised if this species prove a variety of *Bovista gigantea*.

2. L. *pratense*, white, soft, hemispherical, subsessile, somewhat smooth, warts scattered. *Pers.* Syn. Fung. p. 142. *Hook.* Fl. Scot. 2. p. 11. *Lyc. Proteus cepæforme*, *Bull.* p. 148. t. 435. f. 2.

HAB. 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.

3. L. *excipuliforme*, large, white, variable; peridium subglobose, covered with spinulose warts; stipes somewhat smooth, long and plicate. *Pers.* Syn. Fung. p. 143. *Hook.* Fl. Scot. 2. p. 11. *Lyc. Proteus v. excipuliforme*, *Bull.* p. 148. t. 450. f. 2.

HAB. 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.

4. L. *pyriforme*, cæspitose, pyriform, umbonate, pale brown; scales in the form of minute, slender, spinous processes; root consisting of long fibres. *Pers.* Syn. Fung. p. 148. *Bull.* t. 32. *Hook.* Fl. Scot. 2. p. 11. *Lyc. ovoideum*, *Bull.* t. 435. f. 3.

HAB. 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 synonymes, that the task of reconciling them is almost hopeless.

181. SCLERODERMA. *Pers.*

(The little conglobated 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-

ted below, lacunose and variously divided at the root. *Grev.* Crypt. Fl. t. 48. *Pers.* Syn. p. 154. *Lycoperdon verrucosum*, *Bull.* t. 24. *Lyc. defossum*, *Sow.* Fung. t. 311.

Hab. On the ground in plantations among grass. Newliston woods, Messrs Wauch and Greville. Abercorn park, abundant near the entrance. Autumn.

A large handsome plant, 2–5 inches in diameter, 2–4 inches high, including the large root. After bursting, which it does at the summit, it discharges a large quantity of sporular dust, of a purplish colour. The substance of the peridium is then extremely coriaceous, and the segments of the opening usually rolled back. In this stage it has much the habit of a *Lycoperdon*.

2. S. *cepa*, globose, subdepressed, very firm, smooth or warty, sessile, or with a very short thick stipes; root scarcely any. *Grev.* Crypt. Fl. t. 66. *Pers.* Syn. Fung. p. 155. *Tuber solidum*, *With.* Bot. Arr. ed. 6. v. 4. p. 443.

Hab. On the ground in plantations and pastures. Autumn. Craiglockhart.

Diameter 1–2 inches, very firm, surface often cracked, smooth, but sometimes warty. Within, if cut with a knife, blue-black, but if torn asunder, blue-grey, as the small conglobated masses of sporules are not then divided. Persoon seems to think the plant described by Vaillant as a different species, because it is so warty as to be rough and papillose; I have, however, seen this species in every intermediate state, from being merely reticulated and quite smooth, to papillose, and even muricated.

182. BOVISTA. *Pers.*

1. B. *nigrescens*, large, white, becoming blackish-brown, plicate beneath. *Pers.* Syn. Fung. p. 136. *Hook.* Fl. Scot. 2. p. 10. *Lyc. Bovista*, *Sow.* Fung. t. 331.

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.

2. B. *gigantea*, almost sessile, very large, globular, yellowish-white, with scattered, nearly obsolete scales. *Lycoperdon giganteum*, *Pers.* Syn. Fung. p. 140. *Hook.* Fl. Scot. 2. p. 11. *Lyc. Bovista*, *Bull.* t. 447.

Hab. In meadows, pastures, gardens, &c., after rain. King's Park, Edinburgh, Lightfoot.

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.

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.*

1. C. *striatus*, obconical, external surface umber-brown, shaggy, internal surface pale greyish, striated. *Pers.* Syn. Fung. p. 237. *Hook.* Fl. Scot. 2. p. 18. *Nidularia striata*, *Bull.* p. 166. t. 40. f. A. *Sow.* Fung. t. 29.

HAB. On the ground, or on sticks in damp woods. Foxhall, Captain Wauch.

The only species with a shaggy surface.

2. C. *crucibulum*, hard, woody, subcylindrical, or somewhat campanulate, ochrey-yellow, subtomentose at the base; smooth and even within. *Grev.* Crypt. Fl. t. 34. *Pers.* Syn. Fung. p. 238. *Hook.* Fl. Scot. 2. p. 18. *Nidularia lævis*, *Bull.* t. 140. *Sow.* Fung. t. 30.

HAB. On decaying wood, sticks, chips, &c., woods and hedges. Foxhall, Captain Wauch. Abercorn woods. Braid Hermitage. Auchindenny, &c. Autumn.

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.

3. C. *olla*, campanulate, brownish externally, slightly downy; internal surface smooth, livid grey. *Pers.* Syn. Fung. p. 237. *Hook.* Fl. Scot. 2. p. 18. *Nidularia campanulata*, *Sow.* Fung. t. 28. *Nid. vernicosa*, *Bull.* t. 488. f. 1.

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. *Artimesiæ*, 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.

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* 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.

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.

Hab. On *Lathyrus pratensis*, late in autumn. Very frequent in hedges and borders of fields.

Sometimes so completely covering a whole plant as to give it a hoary habit. Often occurring with a variety of *Uredo Fabæ*.

5. E. *Betulæ*, on the under surface, scattered, very visible, blackish; filaments few, simple, not rendering the leaf whitish. *De Cand.* Fl. Franç. v. 6. p. 107.

Hab. On birch-leaves. Summer and autumn. Slateford.

Very regularly scattered over the whole leaf; filaments very fine at their extremity.

6. E. *Robiniæ*, 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. *Arctii*, on the under surface, thickly covering the whole leaf; filaments simple? granuliferous bodies, pyriform, small.

Hab. On the leaves of the common Burdock, (*Arctium Lappa*). Summer and autumn. King's Park and elsewhere, common.

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. *Aquilegiæ*, 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. *Achemillæ*, on the under surface, very numerous, minute, filaments few, forming no filamentous or pulverulent appearance to the naked eye.

Hab. On *Achemilla vulgaris*, (common Lady's-mantle). Summer and autumn. Auchindenny woods, and about Edinburgh, not unfrequent.

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.

HAB. On the common garden-pea. Autumn. Foxhall, Captain Wauch-Gardens about Edinburgh, frequent.

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.

11. E. *Aceris*, on the under surface, scattered, at length concave; filaments elongated, interwoven. *De Cand.* Fl. Franç. v. 6. p. 104.

HAB. On Maple and Sycamore leaves. Foxhall. Autumn.

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. Rosslyn 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.

HAB. On *Symphitum tuberosum*, *Lycopsis arvensis*, &c. About Edinburgh. Autumn.

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.

HAB. On *Ranunculus acris*. Slateford, &c. Autumn. Probably on many other species.

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* Tuberculariа. *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, tuberculose, 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. *Scl. varium*, *ββ.* *Alb.* and *Schw.* p. 75. *De Cand.* in Mem. du Mus. v. 2.

Hab. On putrid fruit. On a decayed peach. Balmuto.

I have little doubt of this being *Tremella ustulata* of Persoon, as Albertini and Schweiniz suggest. It is certainly a Sclerotium, and distinct from *Scl. 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.

4. S. *Quercinum*, epiphyllous, scattered, globular or subdepressed, smooth, pale, at length black; substance very corneous. *Grev.* Crypt. Fl. t. 77. *Pers.* Syn. Fung. p. 124. *Scl. pustula*, *De Cand.* Fl. Franç. v. 6. p. 113., and in Mem. du Mus. v. 2.

Hab. On dead leaves of trees, but chiefly oak-leaves, in damp woods. Swanston wood and at Balmuto.

Rare; ½–1½ lines in diameter, regular in form; merely attached to the leaf, or partly penetrating it.

5. S. *durum*, deep black, oval or elongated, corneous, at length substriate or rugose; white within. *Grev.* Crypt. Fl. t. 1. *Pers.* Syn. Fung. p. 121. *De Cand.* in Mem. du Mus. v. 2. p. 415. t. 14. f. 3. *Hook.* Fl. Scot. 2. p. 10 *Sphæria solida*, *Sow.* Fung. t. 314.

Hab. On the dead stems of large herbaceous plants, especially potato-stalks and the larger *Umbelliferæ*. 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

confluent, reddish fulvous. *Pers.* in *Moug.* et *Nestl.* Pl. Exsic., No. 386. *De Cand.* in Mem. du Mus. v. 2.

HAB. On the leaves of *Salix capræa* 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.

7. S. *populneum*, minute on both sides of the leaf, numerous, dark, mostly angular and subconfluent. *Pers.* Syn. Fung. p. 125. *De Cand.* in Mem. du Mus. v. 2. p. 401. *Moug.* et *Nestl.* St. Crypt. Exsicc. No. 384.

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.

8. S. *Pteridis*, black, very minute, roundish or oval, numerous, depressed. *Pers.* in litt. *Moug.* et *Nestl.* St. Exsic. No. 673.

HAB. On the dead stems of *Pteris aquilina*, often intermixed with *Stromatosphæria striæformis*, 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 aggregate, very black, orbicular, depressed. *Pers.* in litt. *Moug.* et *Nestl.* St. exsicc. No. 674.

HAB. On the dead and dry stems of *Aconitum Napellus*, *Hemerocallis flava* and *fulva*, &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 circumstance renders the situation of the genus in a system embarrassing.)

1. T. *vulgaris*, gregarious, deep red, rugose, furnished with a very short thick pale stipes. *Pers.* Syn. Fung. p. 112. *Hook.* Fl. Scot. 2. p. 9. *Clavaria coccinea*, *Sow.* Fung. t. 294.

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.

2. T. *confluens*, gregarious, confluent, depressed, flesh-red, small, somewhat plane, subangular. *Pers.* Syn. Fung. p. 113. *Hook.* Fl. Scot. 2. p. 9.

HAB. On the dead branches of *Acer pseudo-platanus*, in autumn and spring. Slateford. Braid Hermitage.

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.

XIV. BYSSOIDEÆ. *Grev.*

DIV. I. *Filaments minute, jointed. Sporules free, lying in the centre, or scattered through the whole mass.*

187. FUSIDIUM. *Link.*

1. F. *griseum*, mass thin, irregular, of a whitish or grey colour. *Grev.* Crypt. Fl. v. 2. t. 102. *Ditm.* in Sturm's Deutschl. Fung. t. 17. *Link.* in Berl. Mag. v. 3. p. 8.

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.

2. F. *flavo-virens*, mass irregular, thin, bright yellow or greenish. *Grev.* Crypt. Fl. v. 2. t. 102. *Ditm.* in Sturm's Fung t. 18. *F. æruginosum*, *Link.* in Berl. Mag. v. 3. p. 8. ?

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, interspersed 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.

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.

3. S. *sulphureum*, tufts yellow, irregular, roundish; filaments lax, entangled; sporules numerous, subglobose. *Grev.* in Wern. Trans. v. 4. p. 69. t. 5. f. 3. *Monilia sulphurea*, *Pers.* Syn. Fung. p. 691. ??

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. laxum* of Link, but that species has oblong sporules. It may be *S. candidum*, but does not answer to the whole description.

189. TRICHODERMA. *Pers.*

1. T. *viride*, tufted; tufts roundish, composed of snow-white interwoven filaments; sporules profuse, green, at length giving the whole a green colour. *Pers.* Syn. Fung. p. 231.

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 *Gastromyci*.

190. TRICHOTHECIUM. *Link.*

1. T. *roseum*, tufted; tufts distinct, at length sometimes confluent; filaments white; sporules pink, very numerous, oval. *Link* in Berl. Mag. v. 3. p. 18. *Trichoderma roseum*, *Pers.* Syn. Fung. p. 231.

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.*

1. S. *mycophilum*, spreading widely within putrefying *Agarici* and *Boleti*; filaments white; sporules profuse, bright orange-yellow. *Link* in Berl. Mag. 3. p. 18. *Schm.* et *Kunze*, Deutchl. Schwaem. No. 223. *Uredo mycophila*, *Pers.* Syn. Fung. p. 214.

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.*

1. I. *microscopica*, extremely minute, scattered, simple, club-shaped, very white, filaments and sporidia indistinct. *Grev.* Crypt. Fl. t. 3.

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.*

1. C. *hydnoides*, growing in small tufts; filaments subconfluent, simple or branched, and fasciculated. *Albert.* et *Schw.* p. 358. t. 2. f. 7. *Link* in Berl. Mag. v. 3. p. 20. t. 1. f. 33. *Pers.* Mycol. v. 1. p. 43. *Isaria mucida*, *Pers.* Syn. Fung. p. 688.

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.*

1. S. *candidum*, filaments branched, erect, remotely jointed, scattered, white; sporules globular. *Grev.* in Wern. Trans. v. 4. p. 72. t. 5. f. 6.

HAB. On dead wood. Autumn. Near Edinburgh.

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.*

1. P. *sparsum*, barren filaments effused, interwoven; fertile ones simple, somewhat scattered; heads of sporules white. *Grev.* Crypt. Fl. t. 58. f. 2. *P. candidum ejusd.* Wern. Trans. v. 4. p. 71. excl. Syn.

HAB. On semiputrid stalks of herbaceous plants, in autumn. Near Edinburgh on *Arctium Lappa.*

Spreading in broad lines; the *barren filaments* forming a very delicate lax web; the *fertile ones* erect, subdistinct, and very white.

2. P. *glaucum*, densely tufted, spreading; heads of sporules at length glaucous. *Grev.* Crypt. Fl. t. 58. f. 1. *Link* in Berl. Mag. 3. p. 17. t. 1. f. 24. *Pers.* Mycol. v. 1. p. 40. *P. expansum*, *Link.* l. c. *Nees*, Syst. t. 4. f. 59.

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.*

1. A. *glaucus*, tufted, minute, formed of white erect filaments, with little heads, at first white, but when mature of a glaucous colour. *Link* in Berl. Mag. v. 3. p. 16. t. 1. f. 23. *Monilia glauca*, *Pers.* Syn. Fung. p. 691. et Mycol. v. 1. p. 29. *Hook.* Fl. Scot. 2. p. 33.

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. *laneus*, 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.

3. A. *virens*, tufts rather dense, filaments entangled, suberect; heads as well as the filaments greenish. *Link* in Berl. Mag. v. 3. p. 16. *A. virescens*, *Pers.* Mycol. v. 1. p. 31.

HAB. On decaying Agarics, &c. Carlowrie; on Agarics 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.

4. A. *penicillatus*, filaments scattered, gregarious, about a line high, supporting an elongated tuft of beaded sporidia. *Grev.* Crypt. Fl. t. 32.

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.*

1. B. *diffusa*, very lax, tufted, white, branched; branches few, long, spreading, set with short patent ramuli, bearing round clusters of sporules. *Alb.* et *Schw.* p. 362. *Grev.* in Wern. Trans. v. 4. p. 72. t. 5. f. 7. *Pers.* Mycol. v. 1. p. 36.

HAB. On the semiputrid stems of the larger herbaceous plants. On *Arctium Lappa*, near Edinburgh. Autumn.

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 agarics 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*.

4. B. *parasitica*, somewhat tufted, lax, white, not much branched; sporules roundish. *Pers.* Obs. Mycol. v. 1. p. 96. t. 5. f. 6. *Sow.* Fung. t. 359. *Pers.* Mycol. v. 1. p. 35.

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.*

1. A. *fuscum*, filaments spreading, branched, olive-brown; pedicels of the sporules numerous, alternate. *Schmidt.* Mykol. hefte 1. p. 79. t. 2. f. 23. *Pers.* Mycol. v. 1. p. 27.

HAB. On dead wood and sticks. Braid Hermitage. Autumn.

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.*

1. C. *Herbarum*, tufted, extremely minute, of an olive-green colour, becoming blackish and rigid in old age. *Link* in Berl. Mag. v. 7. p. 37. *Nees*, Syst. p. 66. t. 5. f. 64. *Dematium herbarum*, *Pers.* Syn. Fung. p. 699. et Mycol. v. 1. p. 13.

HAB. On dead stems and leaves of herbaceous plants, common. Summer and autumn.

Very minute, and, according to Persoon in his new work *Mycologia Europæa*, 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 opake and yellowish, but distinctly jointed.

DIV. III. *Filaments beaded.*

200. ACROSPORIUM. *Nees.*

1. A. *moniloides*, filaments simple, forming white spots of one or two lines in length on the living leaves of grasses. *Grev.* Crypt. Fl. t. 73. *Nees*, Syst. p. 53. t. 4. f. 49. *Pers.* Mycol. v. 1. p. 23.

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.*

1. T. *Herbarum*, filaments densely crowded, so as to form a broad black crust. *Link* in Berl. Mag. v. 3. p. 21. *Pers.* Mycol. v. 1. p. 21. *Monilia herbarum*, *Pers.* Syn. Fung. p. 639.

Hab. On the dying stems of large herbaceous plants. Pentland Hills. Autumn.

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.*

1. R. *cellare*, very soft, lax, much interwoven, of a greenish-black colour; filaments intermixed with irregular granules. *Pers.* Syn. Fung. p. 701. et Mycol. v. 1. p. 67. *Hook.* Fl. Scot. 2. p. 34. *Fibrillaria vinaria*, *Sow.* Fung. t. 432.

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.*

1. O. *auricomum*, very irregular, rigid and diverging when young from a common centre, afterwards straggling; filaments tawny orange colour, compressed, of various sizes. *Link* in Berl. Mag. v. 3. p. 21. *Pers.* Mycol. v. 1. p. 87. *Dematium strigosum*, *Pers.* Syn. Fung. p. 695. *Hook.* Fl. Scot. 2. p. 34.

Hab. On rotting 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.*

1. H. *candida*, mostly on dead leaves; filaments very fine, white, radiating, dilated at the extremities in a plumose manner. *Pers.* Syn. Fung. p. 704. *Hook.* Fl. Scot. 2. p. 35. *H. plumosa*, *Pers.* Mycol. v. 1. p. 90. *Fibrillaria stellata*, *Sow.* Fung. t. 387. f. 1.

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 ANANDRÆ 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.*

1. F. *tremelloides*, minute, roundish or oval, subgelatinous; sporules long, slender, slightly curved. *Grev.* Crypt. Fl. t. 10. *Tremella urticæ*, *Pers.* Syn. Fung. p. 628. et Mycol. v. 1. p. 104.

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

GENERA.

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.

Acer,	2.	xlii	88
Achillea,	2.	liv	182
Acremonium,	1.	lxxx	468
Acrosporium,	2.	lxxxi	469
Adenarium,	1.	xliii	98
Adoxa,	1.	xlii	91
Æcidium,	20.	lxxvii	444
Ægopodium,	1.	xxxix	70
Æthusa,	1.	xxxix	66
Agaricus,	85.	lxxiv	369
Agrimonia,	1.	xliv	105
Agrostemma,	1.	xliv	101
Agrostis,	4.	xxxiii	16
Aira,	6.	xxxiii	18
Ajuga,	1.	xlvii	128
Alchemilla,	2.	xxxv	39
Alectoria,	1.	lxxii	348
Alisma,	2.	xli	85
Allium,	3.	xli	75
Alnus,	1.	lvi	201
Alopecurus,	2.	xxxii	14
Amanita,	1.	lxxiv	369
Anagallis,	2.	xxxvi	49
Anchusa,	1.	xxxvi	45
Andræa,	2.	lxi	223
Anemone,	1.	xlvi	122
Angelica,	1.	xxxviii	64
Anictangium,	1.	lxi	229
Anomodon,	2.	lxiii	250
Anthemis,	2.	liv	181
Anthoxanthum,	1.	xxxii	7
Anthriscus,	1.	xl	71
Anthyllis,	1.	li	155
Antirrhinum,	3.	xlviii	136
Apargia,	3.	lii	167
Apium,	2.	xxxix	68
Aquilegia,	1.	xlvi	121
Arabis,	2.	xlix	143
Arctium,	1.	liii.	171
Arenaria,	6.	xliii	98
Arscyria,	2.	lxxviii	455
Artemisia,	4.	liii	175
Arum,	1.	lvii	202
Arundo,	2.	xxxiii	17
Ascobolus,	1.	lxxvi	426
Ascophora,	1.	lxxvii	448
Asparagus,	1.	xli	77
Asperocaulon,	2.	lxvii	307
Aspergillus,	4.	lxxx	467
Asperugo,	1.	xxxvi	46
Asperula,	1.	xxxiv	35
Aspidium,	7.	lx	221
Asplenium,	5.	lx	219
Aster,	1.	liv	179
Asteroma,	2.	lxxiv	368
Astragalus,	3.	lii	159
Atriplex,	5.	lix	211
Atropa,	1.	xxxvi	53
Avena,	4.	xxxiv	10

Ballota, -	1.	xlvii	132
Bangia, -	3.	lxvi	301
Barbarea, -	2.	xlix	143
Bartramia, -	3.	lxii	252
Bartsia, -	1.	xlviii	134
Bellis, -	1.	liv	180
Berberis, -	1.	xl	82
Beta, -	1.	xxxvii	59
Betonica, -	1.	xlvii	131
Betula, -	1.	lvii	203
Bidens, -	1.	liii	174
Blechnum, -	1.	lx	217
Bœomyces, -	2.	lxxi	346
Boletus, -	7.	lxxv	403
Borago, -	1.	xxxv	46
Borrera, -	3.	lxxi	339
Botrychium, -	1.	lx	217
Botrytis, -	4.	lxxx	468
Bovista, -	2.	lxxix	458
Brassica, -	4.	l	146
Briza, -	1.	xxxiii	24
Bromus, -	10.	xxxiv	27
Bryopsis, -	1.	lxvii	307
Bryum, -	19.	lxii	265
Bunium, -	1.	xxxviii	63
Butomus, -	1.	xlii	92
Buxbaumia, -	1.	lxii	251
Cakile, -	1.	xlix	139
Calicium, -	3.	lxix	328
Callitriche, -	1.	lv	188
Calluna, -	1.	xlii	88
Callithamnion,	3.	lxvii	311
Caltha, -	1.	xlvi	127
Camelina, -	1.	xlix	142
Campanula, -	4.	xxxvii	50
Cantharellus, -	2.	lxxiv	396
Cardamine, -	3.	xlix	143
Carduus, -	4.	liii	171
Carex, -	35.	lvi	189
Carpinus, -	1.	lvii	203
Carum, -	1.	xxxix	69
Castanea, -	1.	lvii	203
Cenomyce, -	15.	lxxi	342
Centaurea, -	3.	liv	182
Ceramium, -	4.	lxvii	310
Cerastium, -	4.	xliv	102
Ceratium, -	1.	lxxx	466
Ceratophyllum,	1.	lvii	201
Cetraria, -	2.	lxxi	340
Chara, -	4.	lxiv	281
Chærophyllum,	2.	xxxix	68
Chætophora, -	2.	lxviii	321
Cheiranthus, -	1.	l	145
Chelidonium, -	1.	xlv	119
Chenopodium,	7.	xxxvii	57
Chondria, -	7.	lxv	290
Chordaria, -	1.	lxv	288
Chrysanthemum,	2.	liv	180
Chrysosplenium,	2.	xliii	93
Cichorium, -	1.	lii	171
Cicuta, -	1.	xxxix	66
Cinclidotus, -	1.	lxi	231
Circæa, -	1.	xxxi	2
Cladosporium, -	2.	lxxxi	469
Cladostephus, -	2.	lxviii	312
Clavaria, -	14.	lxxv	412
Clematis, -	1.	xlvi	122
Clinopodium, -	1.	xlviii	133
Cnicus, -	5.	liii	172
Cochlearia, -	3.	xlix	140
Collema, -	5.	lxxii	350
Comarum, -	1.	xlv	118
Conferva, -	21.	lxviii	315
Conium, -	1.	xxxviii	63
Convallaria, -	1.	xli	77
Convolvulus, -	2.	xxxvi	49
Corallorrhiza, -	1.	lv	187
Cornicularia, -	1.	lxxii	349
Cornus, -	2.	xxxv	38
Coronopus, -	1.	xlix	139
Corydalis, -	1.	li	153
Corylus, -	1.	lvii	204
Cratægus, -	1.	xlv	109
Craterium, -	2.	lxxix	456
Crepis, -	1.	lii	170
Crithmum, -	1.	xxxviii	62
Cryptosphæria,	20.	lxxiii	359
Cucurbitaria, -	4.	lxxiii	359
Cuscuta, -	1.	xxxvii	60
Cyathus, -	3.	lxxix	459
Cylindrosporium,	1.	lxxxi	471
Cynoglossum, -	1.	xxxvi	45
Cynosurus, -	1.	xxxiv	25
Cystoseira, -	2.	lxiv	285
Dactylis, -	1.	xxxiii	24
Dædalea, -	2.	lxxv	398
Daphne, -	1.	xlii	88
Daucus, -	1.	xl	71
Delesseria, -	8.	lxv	292
Dianthus, -	2.	xliii	95
Dicranum, -	15.	lxii	238
Diderma, -	1.	lxxviii	453
Didymodon, -	4.	lxii	244
Digitalis, -	1.	xlviii	138
Dipsacus, -	1.	xxxiv	34
Doronicum, -	1.	liv	179
Draba, -	2.	xlix	141
Draparnaldia, -	1.	lxviii	321
Drosera, -	1.	xl	74
Dyplotaxis, -	1.	l	147
Echium, -	1.	xxxv	47
Ectocarpus, -	3.	lxviii	314
Empetrum, -	1.	lviii	209
Encalypta, -	3.	lxi	233
Endocarpon, -	4.	lxx	329

Epilobium,	6.	xlii	85
Epimedium,	1.	xxxiv	38
Epipactis,	1.	lv	186
Equisetum,	6.	lix	213
Erica,	2.	xlii	87
Erineum,	0.	lxxvii	449
Eriophorum,	3.	xxxi	12
Erodium,	2.	l	148
Ervum,	1.	lii	158
Eryngium,	1.	xxxviii	61
Erysimum,	1.	l	1
Erysiphe,	14.	lxxix	459
Erythræa,	3.	xxxvi	54
Euonymus,	1.	xxxvii	55
Eupatorium,	1.	liii	174
Euphorbia,	5.	xliv	106
Euphrasia,	1.	xlviii	135
Evernia,	1.	lxxi	342
Fagus,	1.	lvii	203
Fedia,	2.	xxxii	8
Festuca,	8.	xxxiv	25
Ficaria,	1.	xlvi	126
Fistularia,	4.	lxvi	300
Fontinalis,	2.	lxiii	251
Fragaria,	1.	xlv	115
Fragillaria,	1.	lxviii	321
Fraxinus,	1.	xxxii	2
Fucus,	5.	lxiv	283
Fumaria,	2.	li	153
Funaria,	1.	lxii	247
Furcellaria,	1.	lxv	286
Fusarium,	1.	lxxxi	471
Fusidium,	2.	lxxx	464
Galanthus,	1.	xli	75
Galeopsis,	3.	xlvii	131
Galium,	8.	xxxiv	35
Genista,	3.	li	154
Gentiana,	2.	xxxvii	60
Geoglossum,	2.	lxxvi	416
Geranium,	12.	li	149
Geum,	2.	xlv	118
Gigartina,	4.	lxv	289
Glaucium,	1.	xlv	119
Glaux,	1.	xxxvii	56
Glechoma,	1.	xlvii	130
Gloionema,	3.	lxvi	301
Gnaphalium,	5.	liii	176
Griffithsia,	2.	lxvii	312
Grimmia,	6.	lxi	234
Gymnadenia,	1.	lv	184
Gymnostomum,	10.	lxi	226
Gyrophora,	1.	lxx	328
Habenaria,	3.	lv	185
Hedera,	1.	xxxvii	56
Helianthemum,	1.	xlvi	121
Helleborus,	1.	xlvii	127
Helvella,	2.	lxxvi	417
Heracleum,	1.	xxxix	65
Hesperis,	1.	l	146
Hieracium,	7.	lii	167
Himantia,	1.	lxxxi	470
Himanthalia,	1.	lxiv	285
Hippuris,	1.	xxxi	1
Hookeria,	1.	lxiii	253
Holcus,	3.	xxxiii	18
Hordeum,	2.	xxxiii	32
Humulus,	1.	lviii	209
Hyacinthus,	1.	xli	76
Hydnum,	3.	lxxv	405
Hydrocharis,	1.	lviii	211
Hydrocotyle,	1.	xxxviii	61
Hyoscyamus,	1.	xxxvi	53
Hypericum,	5.	lii	163
Hypochæris,	1.	lii	170
Hypnum,	46.	lxii	253
Hysterium,	7.	lxxiv	366
Ilex,	1.	xxxv	40
Imperatoria,	1.	xxxix	67
Iris,	1.	xxxii	9
Isaria,	1.	lxxx	466
Isidium,	1.	lxxi	346
Juncus,	10.	xli	77
Jungermannia,	33.	lxiii	270
Juniperus,	1.	lix	211
Lactuca,	1.	liii	166
Laminaria,	3.	lxiv	282
Lamium,	4.	xlvii	130
Lapsana,	1.	liii	170
Lathræa,	1.	xlviii	135
Lathyrus,	2.	li	156
Lavatera,	1.	li	153
Leangium,	1.	lxxviii	455
Lecanora,	16.	lxx	331
Lecidea,	18.	lxix	324
Lemna,	3.	xxxii	6
Leocarpus,	1.	lxxviii	453
Leontodon,	2.	liii	166
Leonurus,	1.	xlvii	133
Leotia,	3.	lxxvi	416
Lepidium,	2.	xlix	140
Lepraria,	7.	lxxii	351
Licea,	2.	lxxvii	451
Lichina,	2.	lxv	286
Ligusticum,	1.	xxxviii	64
Ligustrum,	1.	xxxi	2
Linckia,	2.	lxix	322
Linum,	2.	xl	74
Listera,	3.	lv	186
Littorella,	1.	lvi	200
Lithospermum,	3.	xxxv	44
Lolium,	1.	xxxiii	32
Lonicera,	2.	xxxvii	55

Lotus, -	2.	lii	162
Luzula, -	3.	xli	81
Lychnis, -	3.	xliv	102
Lycogola, -	3.	lxxviii	452
Lycoperdon,	4.	lxxix	456
Lycopodium,	4.	lx	215
Lycopsis, -	1.	xxxvi	47
Lysimachia,	2.	xxxvi	48
Malva, -	3.	li	152
Marchantia,	3.	lxiii	279
Marrubium,	1.	xlvii	133
Matricaria,	1.	liv	181
Medicago,	1.	lii	163
Melampyrum,	1.	xlviii	135
Melica, -	3.	xxxiii	20
Mentha, -	5.	xlvii	128
Menyanthes,	1.	xxxvi	48
Mercurialis,	2.	lviii	210
Merisma, -	2.	lxxv	411
Merulius, -	1.	lxxiv	397
Milium, -	1.	xxxiii	15
Montia, -	1.	xxxiv	33
Morchella, -	2.	lxxvi	417
Myosotis, -	4.	xxxv	43
Myriophyllum,	1.	lvi	202
Myrrhis, -	2.	xxxix	67
Mucor, -	1.	lxxvii	448
Næmaspora,	3.	lxxiii	365
Narcissus, -	1.	xli	75
Nardus, -	1.	xxxii	13
Narthecium,	1.	xli	77
Nasturtium,	3.	xlix	144
Neckera, -	1.	lxiii	251
Nodularia, -	1.	lxvi	300
Nostoc, -	2.	lxix	322
Nuphar, -	1.	xlvi	120
Nymphæa, -	1.	xlvi	ib.
Odonthalia,	1.	lxv	296
Œnanthe, -	2.	xxxviii	62
Ononis, -	1.	li	155
Onopordon,	1.	liii	174
Opegrapha,	4.	lxxiii	352
Ophioglossum,	1.	lx	217
Orchis, -	4.	lv	183
Origanum,	1.	xlvii	133
Ornithopus,	1.	lii	158
Ornithogalum,	1.	xli	76
Orobanche,	2.	xlviii	138
Orobus, -	1.	li	156
Orthotrichum,	9.	lxii	247
Oscillatoria,	9.	lxvi	303
Oxalis, -	1.	xliii	101
Ozonium, -	1.	lxxxi	470
Palmella, -	3.	lxix	323
Papaver, -	4.	xlv	119
Parietaria,	1.	xxxv	39
Paris, -	1.	xlii	91
Parmelia, -	16.	lxx	335
Parnassia, -	1.	xl	73
Pedicularis,	2.	xlviii	136
Peltidea, -	4.	lxxi	341
Penicillium,	2.	lxxx	467
Peplis, -	1.	xli	82
Peziza, -	35.	lxxvi	418
Phacidium,	2.	lxxiv	366
Phacorhiza,	2.	lxxvi	415
Phallaris, -	2.	xxxiii	14
Phallus, -	1.	lxxvi	418
Phascum, -	7.	lxi	225
Phellandrium,	1.	xxxix	66
Phleum, -	2.	xxxiii	15
Physarum,	5.	lxxviii	453
Pilobolus, -	1.	lxxvii	448
Pilularia, -	1.	lix	215
Pimpinella,	1.	xxxix	69
Pinguicula,	1.	xxxi	5
Pinus, -	1.	lvii	204
Plantago, -	5.	xxxiv	37
Poa, -	10.	xxxiii	21
Polymonium,	1.	xxxvi	50
Polygola, -	1.	li	154
Polygonum,	7.	xlii	89
Polypodium,	3.	lx	222
Polyporus,	16.	lxxv	398
Polysiphonia,	8.	lxvii	308
Polystigma,	2.	lxxiii	365
Polytrichum,	7.	lxii	245
Populus, -	3.	lviii	210
Porina, -	1.	lxxiii	354
Potamogeton,	7.	xxxv	40
Potentilla,	7.	xlv	116
Primula, -	4.	xxxvi	47
Prunella, -	1.	xlvii	134
Prunus, -	5.	xliv	107
Pteris, -	2.	lx	218
Pterogonium,	1.	lxii	236
Ptilota, -	1.	lxvi	297
Puccinia, -	29.	lxxvii	428
Pulmonaria,	1.	xxxv	45
Pyrethrum,	3.	liv	180
Pyrola, -	2.	xliii	192
Pyrus, -	3.	xlv	09
Quercus, -	2.	lvii	202
Raccodium,	1.	lxxxi	470
Ramalina, -	4.	lxxii	348
Ranunculus,	11.	xlvi	123
Raphanus,	1.	l	148
Reseda, -	2.	xliv	105
Reticularia,	2.	lxxviii	452
Rhinanthus,	1.	xlviii	135
Rhizomorpha,	3.	lxxiii	354
Ribes, -	2.	xxxvii	56

Riccia,	1.	lxiii	280
Rosa,	6.	xlv	111
Rotbollia,	1.	xxxiii	33
Rubus,	6.	xlv	114
Rumex,	7.	xli	82
Ruppia,	1.	xxxv	42
Sagina,	2.	xxxv	42
Salicornia,	1.	xxxi	1
Salix,	15.	lviii	204
Salsola,	1.	xxxvii	59
Salvia,	1.	xxxi	6
Sambucus,	2.	xl	72
Samolus,	1.	xxxvii	55
Sanicula,	1.	xxxviii	61
Saponaria,	1.	lxiii	95
Saxifraga,	4.	xliii	93
Scabiosa,	2.	xxxiv	34
Scandix,	1.	xl	72
Schœnus,	3.	xxxii	9
Scirpus,	9.	xxxii	10
Scleranthus,	1.	xliii	94
Sclerotium,	9.	lxxix	461
Scleroderma,	2.	lxxix	457
Scolopendrium,	1.	lx	218
Scrophularia,	3.	xlviii	137
Scutellaria,	1.	xlvii	134
Scytosiphon,	1.	lxv	288
Scytonema,	3.	lxvi	302
Sedum,	5.	xliii	100
Sempervivum,	1.	xliv	107
Senecio,	5.	liv	178
Sepedonium,	1.	lxxx	466
Sherardia,	1.	xxxiv	34
Silene,	2.	xliii	96
Sinapis,	2.	l	147
Sison,	1.	xxxviii	62
Sistotrema,	1.	lxxv	405
Sisymbrium,	2.	l	145
Sium,	4.	xxxix	64
Smyrnium,	1.	xxxix	70
Solanum,	1.	xxxvi	64
Solidago,	1.	liv	179
Sonchus,	3.	liii	165
Sparganium,	3.	lvi	189
Spergula,	2.	xliv	104
Sphacellaria,	5.	lxviii	313
Sphagnum,	4.	lxi	223
Sphæria,	12.	lxxiii	363
Sphærococcus,	7.	lxv	294
Sphærophoron,	3.	lxxii	347
Spiræa,	3.	xlv	110
Spiloma,	1.	lxix	324
Splachnum,	1.	lxi	231
Spongiocarpus,	1.	lxv	286
Sporochnus,	3.	lxv	287
Sporotrichum,	5.	lxxx	464
Spumaria,	1.	lxxviii	452
Stachys,	4.	xlvii	132
Stachylidium,	1.	lxxx	466
Statice,	1.	xl	73
Stellaria,	6.	xliii.	97
Stemonites,	2.	lxxviii	455
Stereocaulon,	1.	lxxi	347
Sticta,	3.	lxxi	340
Stilbospora,	2.	lxxiv	366
Stilbum,	1.	lxxvii	448
Stratiotes,	1.	xlvi	122
Stromatosphæria,	19.	lxxiii	355
Subularia,	1.	xlix	141
Symphytum,	2.	xxxvi	45
Tetraphis,	2.	lxi	230
Teucrium,	1.	xlvii	128
Thalictrum,	2.	xliv	123
Thelephora,	19.	lxxv	406
Thelotrema,	1.	lxx	330
Thesselinum,	1.	xxxviii	63
Thlaspi,	2.	xlix	139
Thymus,	1.	xlvii	134
Tilia,	1.	xlvi	121
Torilis,	2.	xl	70
Tortula,	8.	lxii	231
Torula,	1.	lxxxi	469
Tragopogon,	1.	liii	165
Tremella,	7.	lxxvii	426
Trichia,	3.	lxxviii	455
Trichoderma,	1.	lxxx	465
Trichostomum,	6.	lxi	242
Tricothecium,	1.	lxxx	465
Trifolium,	11.	lii	159
Triglochin,	2.	xli	84
Triticum,	4.	xxxiv	31
Trollius,	1.	xlvii	127
Tubercularia,	2.	lxxix	463
Tussilago,	2.	liv	177
Typha,	1.	lvi	188
Ulex,	2.	li	155
Ulmus,	2.	xxxviii	59
Ulva,	7.	lxvi	299
Urceolaria,	2.	lxx	330
Uredo,	45.	lxxvii	434
Urtica,	2.	lvi	201
Usnea,	2.	lxxii	349
Utricularia,	2.	xxxi	5
Vaccinium,	3.	xlii	87
Vaginaria,	1.	lxvii	305
Valeriana,	4.	xxxii	7
Variolaria,	3.	lxx	330
Vaucheria,	6.	lxvii	305
Verbascum,	1.	xxxvi	53
Verbena,	1.	xlviii	138
Veronica,	10.	xxxi	3
Verrucaria,	1.	lxxiii	353
Viburnum,	4.	xl	72
Vicia,	6.	li	157

Vinca, -	2.	xxxvi	57	Xyloma, -	8.	lxxiv	367
Viola, -	6.	xxxvii	51				
				Zannichellia,	1.	lv	187
Weissia, -	7.	lxii	236	Zonaria,	2.	lxvi	297
				Zostera, -	1.	lvi	183
Xylaria, -	3.	lxxiii	355	Zygnema,	4.	lxviii	320

Genera, 521.. Species 1794.
Phænogamous Plants, 771.—Cryptogamous, 1023.
Acotyledons, 1023.—Monocotyledons, 182.—Dicotyledons, 589.

FINIS.

P. Neill, Printer.